

The Only Journal With a Paid Circulation in the Rock Products Industry

Rock Products

Vol. XXIV, No. 12

CHICAGO

May 21, 1921

EDITORIAL DEPARTMENT—

Nathan C. Rockwood } Editors
A. H. McQuilkin }
Chas. A. Breskin } Assistant Editors
L. R. Croy }

ADVERTISING STAFF—

Charles H. Fuller, Eastern Manager,
101 West 41st Street, New York City

G. J. Nelson
A. S. Barnett
Western Representatives

SUBSCRIPTION—Two dollars a year to U. S. and Possessions. Three dollars a year to Canada and foreign countries. Twenty-five cents for single copies.

TO SUBSCRIBERS—Date on wrappers indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address.

POST-OFFICE ENTRY—Entered as second-class matter, July 2, 1907, at the Chicago, Ill., Post-office, under the Act of March 3, 1879.

ROCK PRODUCTS—

Geo. P. Miller, Manager
E. M. Gibson, Assistant Manager

Published every other Saturday by

TRADEPRESS PUBLISHING CORP.
542 South Dearborn Street, Chicago, Ill.

W. D. Callender, President.
N. C. Rockwood, Vice-President.
Geo. P. Miller, Treasurer.
C. O. Nelson, Secretary.

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Specify Blaw-Knox Buckets-



A Bucket for Every Crane A Bucket for Every Use

No matter what your present hoisting equipment may be—overhead crane, stiff-leg derrick, monorail, cableway, locomotive or traction crane—we are prepared to furnish quickly a Blaw-Knox Bucket which is *exactly* suited to your requirements.

Blaw-Knox Buckets are manufactured in all sizes and in many standard types—single-line, two-line, three-line, or four-line buckets for every conceivable kind of rehandling and excavating.

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When you buy—our engineering service assures your getting exactly the bucket which you need.

Remember *Blaw-Knox Buckets* when in the market for rehandling equipment—and

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BLAW-KNOX
PITTSBURGH, PA. 619 Farmers Bank Bldg. **COMPANY** New York-Boston-Chicago-Detroit-Kansas City
Baltimore-Birmingham-San Francisco

For YOUR Protection and OURS

Users of Williams' Two-in-one pulverizing machines should be informed of a recent injunction obtained by us against the Kreischer Brick Co. for the use of such a machine. We quote from the decree ordering the injunction by Judge Chatfield, U. S. District Court, Eastern District, as follows:

"The Court thereupon adjudges and decrees that upon this record plaintiff is the sole and exclusive owner of the letters Patent No. 1, 185, 620, set forth in the complaint; granted to plaintiff as the assignee of Joseph K. Blum, for an improvement in Disintegrating Apparatus, and dated June 6th, 1916; that said Letters Patent are good and valid and have been infringed by the defendant herein by the use, or causing to be used, disintegrating apparatus embodying said patented invention, and among others known and designated as the Williams Patent Crusher and Pulverizer."

We are prepared to protect the patents on which "K-B" superiority is founded to the fullest extent.

*You cannot get "K-B" advantages
without using "K-B" machines*



K-B PULVERIZER CO., Inc.

92 Lafayette Street, NEW YORK

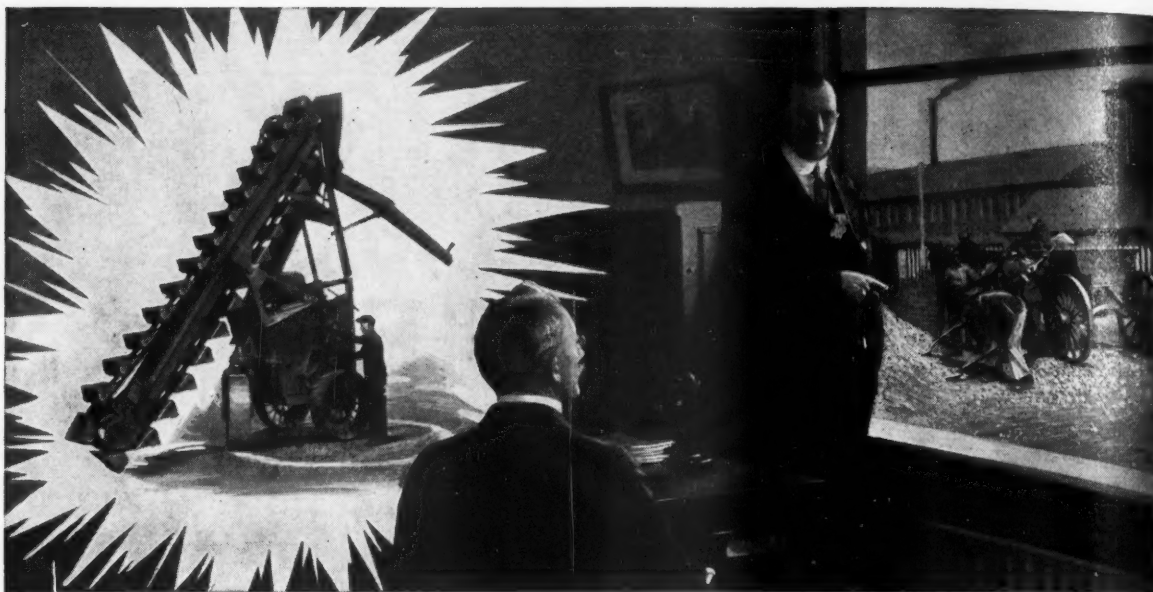
NOTICE!

The one machine sold to Kreischer Brick Mfg. Co., by Williams Pat. Crusher and Pulverizer Company was not a swing hammer crusher of their well known design, but was a crusher of a later design **having a cage in a triangular sliding frame**. It was only this **sliding frame cage** that was adjudged to be an infringement of K-B Pulverizer's Patent. **The sliding cage involved in that suit was the only one sent out. The Williams Company offered to replace it with their standard design, and have since repurchased the alleged infringing machine. The Williams Patent Crusher and Pulverizer Company state the facts, and are noted for originality—not for copying.**

The fact is, the Williams Company sold their 2 in 1 machine for a long time and invite the K-B Pulverizer Co., to bring suit against them to enjoin the sale of this machine. Our guarantee of protection against infringement is given unreservedly to purchasers of our product.

**Williams Patent Crusher and
Pulverizer Company**

St. Louis, Missouri



Why not Mechanically?

"It's costing us too much out there—we must look into the savings of JEFFREY LOADERS."

"A great thought, Peterson, they should cut our loading costs."

"Unquestionably, Mr. Edwards. Jeffrey Loaders are powerful self-feeding machines that will do the work of 5 to 10 men and quicker, with less supervision and at less cost. They dig 10 feet into the pile. The type 'G' Loader, has a capacity of $1\frac{1}{2}$ to 2 cubic yards per minute, the Type 'K' 1 cubic yard.

"I'll send the boy in with the catalogs I received yesterday and we'll take the matter up as soon as you have looked them over."



Write for it! Catalog No. 288-N on Type G or No. 309-H on Type K—or both. No obligations.

The Jeffrey Manufacturing Co.

935 North Fourth Street, Columbus, Ohio

New York	Buffalo	Denver	Montreal	Detroit	Middlesboro, Ky.
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JEFFREY

MATERIAL HANDLING MACHINERY

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The membership of this publication in The Associated Business Papers, Inc., means that it has achieved an exceptionally high publishing standard, and has subscribed unreservedly to these—

STANDARDS OF PRACTICE

The publisher of a business paper should dedicate his best efforts to the cause of Business and Social Service, and to this end should pledge himself—

1. To consider, first, the interests of the subscriber.
2. To subscribe to and work for truth and honesty in all departments.
3. To eliminate, in so far as possible, his personal opinions from his news columns, but to be a leader of thought in his editorial columns, and to make his criticisms constructive.
4. To refuse to publish "puffs," free reading notices or paid "write-ups"; to keep his reading columns independent of advertising considerations, and to measure all news by this standard: "Is it real news?"
5. To decline any advertisement which has a tendency to mislead or which does not conform to business integrity.
6. To solicit subscriptions and advertising solely upon the merits of the publication.
7. To supply advertisers with full information regarding character and extent of circulation, including detailed circulation statements, subject to proper and authentic verification.
8. To co-operate with all organizations and individuals engaged in creative advertising work.
9. To avoid unfair competition.
10. To determine what is the highest and largest function of the field which he serves, and then to strive in every legitimate way to promote that function.

If you have read the foregoing standards, there is not much left to be said, except to tell you that these principles are *present day realities* and not merely beautiful ideas for future attainment.

THE ASSOCIATED BUSINESS PAPERS, Inc.

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When writing advertisers please mention ROCK PRODUCTS

WESTERN UNION TELEGRAM

NEWCOMB CARLTON, PRESIDENT

1920 APR 15 PM 12:45

234DS OF 34 P, TULSA OKLA 1130AM APR 15 1920 ST LOUIS

HERCULES POWDER CO

MR. KOCH ASSISTED BY SERGEANT MARTIN MADE ONE OF THE BEST SHOTS YESTERDAY WITH THE BATTERY EVER MADE AT OUR PLANT AT GARNETT WE FEEL GRATEFUL TO YOUR COMPANY FOR YOUR EFFORTS AND ASSISTANCE

THE HUGHES STONE CO 1239PM

Form of Receipt, Order, Invoice, etc.

The Hughes Stone Company

Plant Office: Tulsa, Oklahoma, 22411 Unity Bldg.

PURCHASE ORDER CRUSHED STONE

No. 2154 Tulsa, Okla. April 21 1920

To: Hercules Powder Co.

Please furnish this Company the following materials and ship to us at once:

Via Express To Garnett

As per your quotation of _____

1 Min. Best 5 1/2 x 8 - 40%
Hercules Dynamite

James Rusk J.K.G.

Show above order number on your invoice

Render invoice in DUPLICATE with Bill of Lading attached and mail to _____

at _____

Acknowledge receipt, and if any delay in shipment, advise promptly.

Make no change in this order without authority from us.

THE HUGHES STONE COMPANY

ORIGINAL J. P. Hughes

The Successful Blast

Facts On Hercules "Efforts and Assistance"

The quarry of the Hughes Stone Company is situated at Garnett, Okla. On February 2, 1920, a Hercules salesman, accompanied by a Hercules service man, visited this quarry. After consultation with them, the management decided to make some changes in their previous methods on the next shot. These plans were carried out and on April 12, two Hercules representatives again arrived to assist in loading and shooting 131 holes that had been drilled.

Hercules 40% Extra L. F. Dynamite, 5" x 8" and 4" x 8" size was used. The following results were obtained in the three different sections which were fired separately:

Number of Holes Shot	Pounds of Explosives Used	Solid Cubic Yards of Rock Broken	Lbs. of Explosives Per Solid Cubic Yard of Rock	Solid Cubic Yards Per Lb. of Dynamite	Tons of Rock Broken Per Lb. of Dynamite
21	1700	3520	.483	2.07	4.7
52	3900	8210	.475	2.10	4.7
58	5200	11600	.448	2.25	5.1
Total 131	10800	23330	Average .463	Average 2.15	Average 4.83

Note that practically five tons of rock were broken for each pound of explosive used.

The above telegram and order that we received from the Hughes Stone Company furnish an ample report on the nature of the results obtained with the aid of Hercules Explosives and Service.

HERCULES POWDER CO.



Chicago
Pittsburg, Kan.
San Francisco

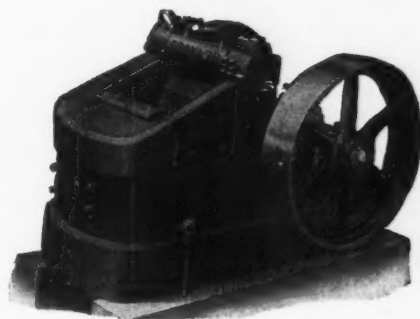
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St. Louis
Denver

Salt Lake City
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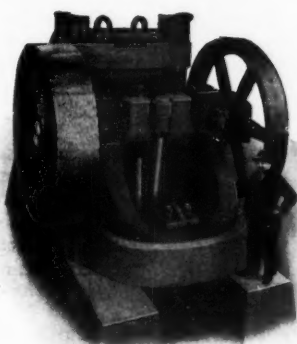


More Crushing AT LESS COST



This is an assured fact—our many exclusive "Bulldog" features not only add to the efficiency of the crushers, but stand for the maximum economy in operation.

TRAYLOR "BULLDOG" CRUSHERS



The lighter but stronger pitman and frictionless toggle system, improvements found only in the "Bulldogs," effect a remarkable power economy as they reduce the friction load at least 80%. The two wrought steel rods in the "Bulldog" pitman are of known strength, therefore, absolutely dependable. The "Bulldog" pitman is of minimum weight and replaces the heavy cumbersome, and unreliable steel casting found in all other jaw crushers.

The "Bulldog" Toggle System is self-aligning, and with toggle ends that roll on flat steel, it is nearly frictionless.

Bulletin RJX-1 is complete—have you a copy?

Traylor Motor Trucks have all the strength, power, efficiency and economy of the "Bulldog" Crushers.

It will pay you to ask for complete data concerning them



Traylor Engineering & Manufacturing Co.

Main Offices and Plant: ALLENTOWN, PA.

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30 Church St.

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CHICAGO
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View of Eastern Laboratory of Repauno Plant, Gibbstown, N. J. One of the five great laboratory groups maintained by the Du Pont Company

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THE tremendous strides made in the development of newer and more efficient types of explosives during the past fifty years are traceable, very largely, to experimental work done in the five great laboratories maintained by the Du Pont Company.

There, working with minutest care over test tube and retort, or at the ballistic testing apparatus, or in the field making practical tests, are over 300 chemical engineers—men who are devoting their lives to devising safer, more efficient and more economical explosives to be the servants of the great productive and constructive industries of the world.

These facilities for experimental work certainly form an important part of Du Pont Explosives Service. Our vast production, so accurately supervised to insure uniform Du Pont quality; our nation-wide, highly-organized system of distribution, and practical service *at the work* by experts whenever desired compose a very remarkable service—which is yours to command.

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Atlantic City, N. J.

E. I. du Pont de Nemours & Co., Inc.

Sales Department, Explosives Division

Wilmington, Delaware





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Give Dependable Service

—just as Du Pont Explosives do. Both are universally accepted as standards of quality. Du Pont Blasting Accessories are designed from the experience gained over a period of 119 years of constant effort, not only to produce explosives of successful and economical type, but to design and manufacture accessories that will make these explosives function to the greatest advantage.

Be sure the Du Pont Oval is on your purchases of

Fuse
Rheostats
Blasting Caps
Leading Wires
Cap Crimpers
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Blasting Machines
Electric Blasting Caps
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Delay Electric Blasting Caps

Our booklet "Blasting Accessories" has up-to-the-minute details on modern blasting practice. Write for free copy.

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Sales Department: Explosives Division

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VULCAN INDUSTRIAL LOCOMOTIVES

and leading Industrial Concerns

Wallace Stone Co.

This is one of three VULCAN Locomotives owned by the Wallace Stone Company.

Workmanship that gives complete satisfaction is always far more satisfactory to both customer and manufacturer than is any short-sighted policy of price only. It is the ideal of the Vulcan Iron Works to produce a product that will always make friends.

VULCAN IRON WORKS

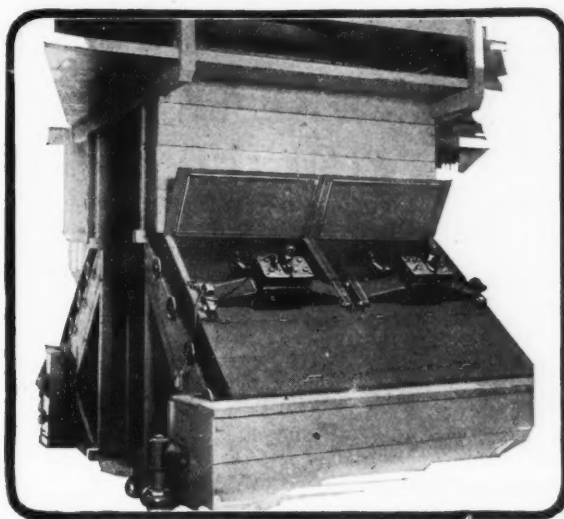
Established 1849

1753 Main Street

Wilkes-Barre, Pa.



When writing advertisers please mention ROCK PRODUCTS



\$0.00148 Per Ton!

cost of operating

Four Hum-mer *Electric* Screens

at one of the largest copper mines in the United States

The figures below were compiled by the
Supt. of Concentrators after a 6-months run.

		Per Cent of Total
Labor for 6 months ending Dec. 1, 1920.....	\$419.08	58.5
Supplies for 6 months ending Dec. 1, 1920.....	168.67	23.6
Power for 6 months, 6405 K.W. @ 2 cents.....	128.10	17.9
Total	\$715.85	100.0
Total dry tons milled and screened during period.....	483,399	
Cost of screening per dry ton milled.....	\$0.00148	

"I am pleased to say that we have recently completed a prolonged test on our "Hum-mer" screen installation.

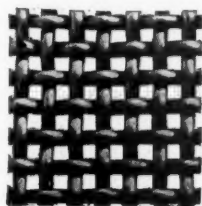
"Our ore carries practically a uniform moisture of 3.5%.

"The feed to the screens is crushed through one inch, practically all through three-quarter inch, and the screening is done dry. We desire a 4 mesh undersize product for primary table treatment.

"Feed is delivered at the rate of 4200 dry tons per 24 hours by a conveyor above the screens and is evenly divided by two steps. At the head of each screen, the feed is retarded and spread by a suspended, weighted gate.

"In general I will say that we are entirely satisfied with the work of the screens."

Superintendent of Concentrators.

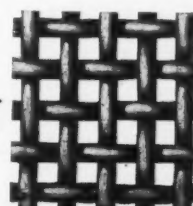


The Hum-mer Electric Screen can be used to screen any material—wet, damp or dry. Send for Catalogue No. 42-R.

THE W. S. TYLER COMPANY

CLEVELAND, OHIO

Manufacturers of Woven Wire Screens and Screening Equipment



When writing advertisers please mention ROCK PRODUCTS

TELSMITH— THE BREAKER WITH THE PILLAR SHAFT

Telsmith is the only gyratory crusher on the market having a rigid (not gyratory nor rotary) shaft. It combines the following important advantages:

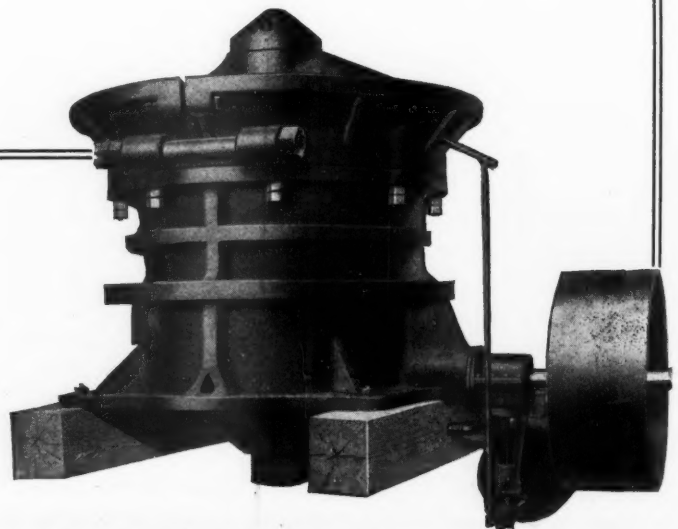
- A**—Shaft is guaranteed absolutely unbreakable.
- B**—Receiving and crushing areas are 20-30 per cent greater than in any other gyratory breaker.
- C**—Crushing pinch is parallel to axis of crusher—just as long at top of the head as at the bottom. No slippage even with smooth gravel boulders.
- D**—Crusher structure is shorter, stronger and heavier (per inch of height) than in any other machine.
- E**—Force feed lubrication and perfect exclusion of dirt. Big reserve of oil, with constant cooling, straining and deposition of extraneous matter.
- F**—Write for our catalog No. 166 (Telsmith Primary Breaker) and bulletin No. 2-F 11 (Telsmith Reduction Crusher).

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806 Old Bldg.,
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110 W. Park Way,
Pittsburgh, Pa.
325 W. Main St.,
Louisville, Ky.
6110 Euclid Ave.,
Cleveland, Ohio.
Franklin and Channing
Aves., St. Louis, Mo.

2540 University Ave.,
St. Paul, Minn.
Bowman Mch. Co.,
Omaha, Nebr.
625 Market St.,
San Francisco, Calif.
Salt Lake Hardware Co.,
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Road Builders Equipment
Co., Portland, Ore.
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Representatives:
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P. Q.



When writing advertisers please mention ROCK PRODUCTS

"We have operated your equipment continuously for four years and it has given such good satisfaction that we even thought repairs were unnecessary, but the other day we discovered that the beater blades had completely worn away."

So spoke the Superintendent of a Hydrated Lime Plant the other day when he called on us.

It will give you some idea of how substantially all Raymond Equipment is built and show you that the ultimate satisfaction of continuous operation is far more important than the initial cost.

Raymond Equipment is always built upon this basis of ultimate satisfaction to the user. No pains are spared to use the best materials obtainable and the best workmanship in putting them together.

That is why hundreds of satisfied users employ Raymond Equipment with Air Separation to produce their fine powdered materials and why 75 per cent of our business is repeat orders.

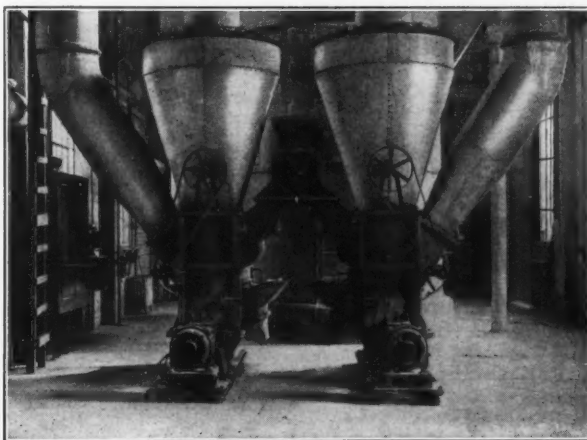
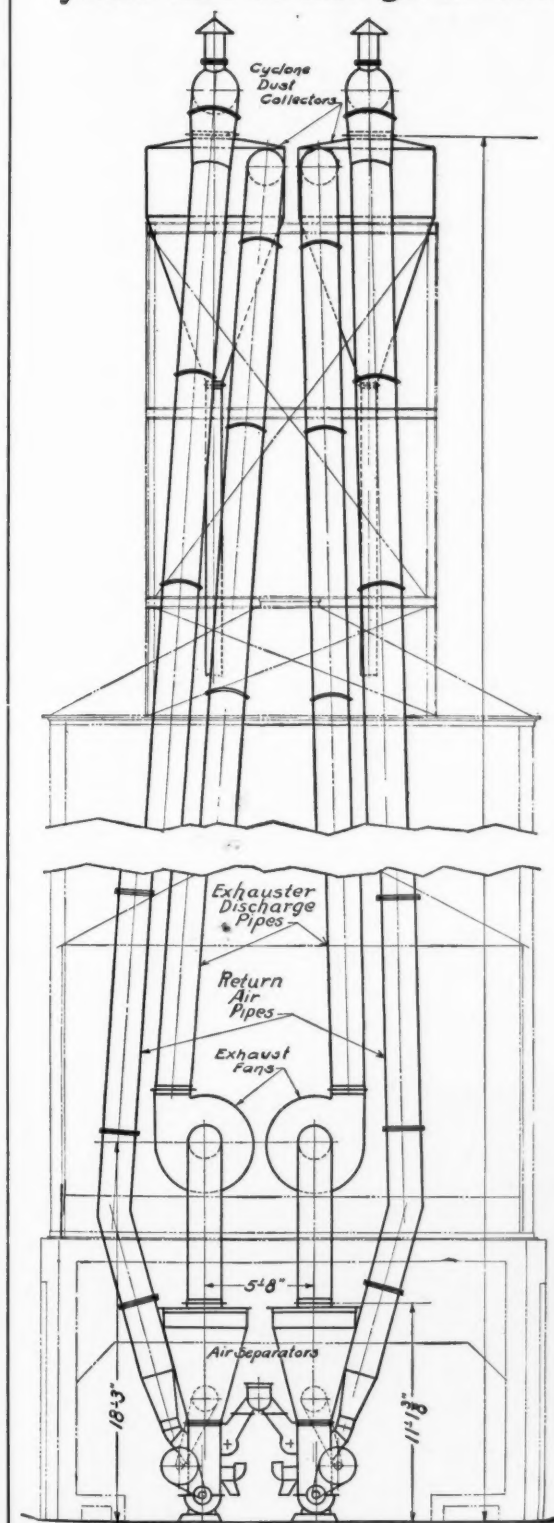
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1301 North Branch Street

Chicago, Ill.

Western Office: 201 Boston Bldg., Denver, Colo.

Eastern Office: 5th Floor, Grand Central Palace, New York City



When writing advertisers please mention ROCK PRODUCTS

MYERS-WHALEY SHOVELING MACHINES

Insure a Flexible Operation and Maximum Production at Minimum Cost

In times of great activity production can be increased without materially increasing number of men. In slack times only a very small force has to be "cared for." When speeding up again it can be done without delay.

A recent illustration of this has just come to our attention. A plant had been closed for three months, and the mine (equipped with Myers-Whaley shovels) was shut down. It resumed operations a few weeks ago, using two Myers-Whaley No. 4 machines, which loaded from the first day they resumed operation an average of **650 tons** per shift, with a crew of 3 men on each machine. This we consider real shoveling at less cost than any other known method underground. This is only one instance of the efficiency and economy that can be obtained by the use of the MYERS-WHALEY in underground loading.

Don't be dependent on hand labor just because your conditions prohibit the use of a steam shovel. The MYERS-WHALEY machine, the first successful underground loading machine, has made it possible to load underground as economically as on the surface.

The partial list of users given in our treatise on "The Use of Shoveling Machines in Underground Work" shows the wide use of the Myers-Whaley in tunnels, mines and quarries.

When writing mention your conditions.

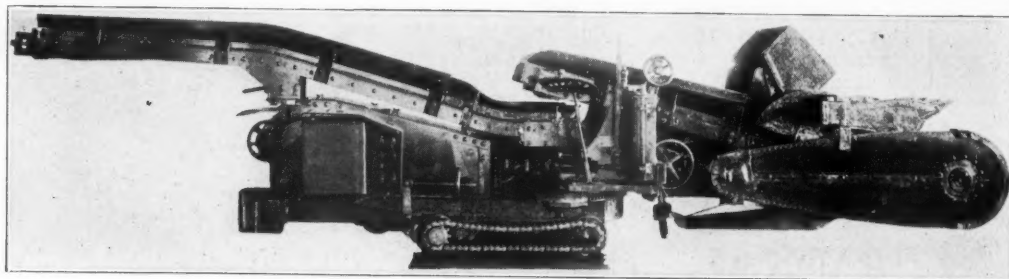
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Victor Loughheed, 96 Ninth St., San Francisco, Calif.
Richardson, McCabe & Co., Wellington, New Zealand.
Mitsui & Co., for Manchuria and Shantung.

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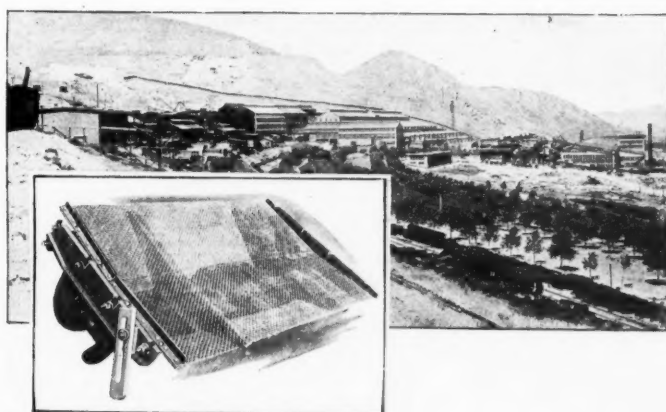
Here is the record of a Mitchell Screen Vibrator, summed up on the 506th day after the screen's installation.

1. It had run the full 506 days, 24 hours a day, without ever being taken from the frame—without even being stopped a moment for repairs.
2. It handled the following tonnage of ore in that time (operating in closed circuit with rolls):
Total feed to screen (includes circulating load) 1,152,606 tons
Total screen undersize (final product) 594,027 tons

Total screen oversize (circulating load) 558,579 tons

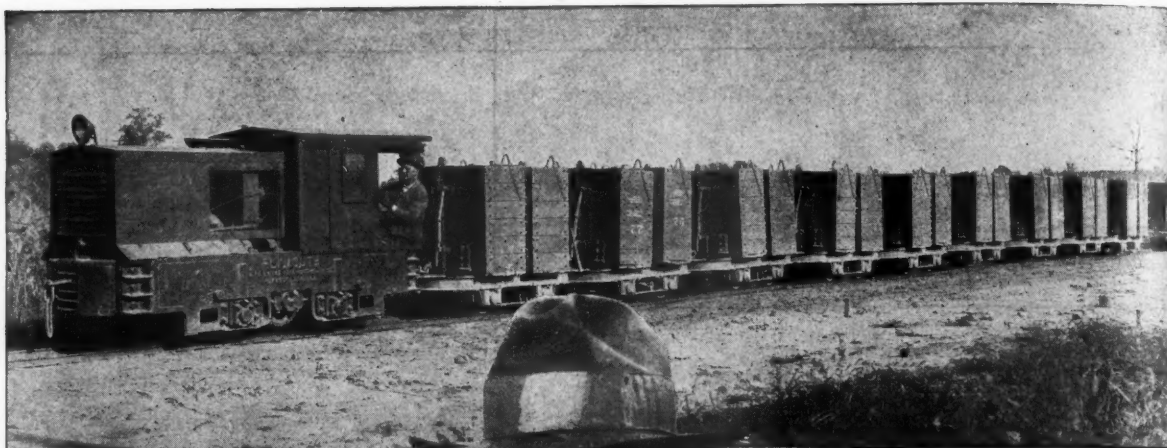
3. In all that time and with that heavy tonnage it averaged only $\frac{1}{2}$ h.p. per day.
4. Total screening cost per ton, including wire cloth, power and labor, less than one-tenth of a cent per ton!
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Note particularly the achievement of handling more than a million tons of material at a cost of less than one-tenth of a cent per ton!



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Plymouth, Ohio

PLYMOUTH

Gasoline Locomotives

Rock Products

Volume XXIV

May 21, 1921

Number 11

Compact Lime and Crushed Stone Plant in Ohio

National Mortar and Supply Co., Pittsburgh, Pa., Has Attractive Layout and Facilities for Smooth Operation at Springfield, Ohio, Plant

THE NATIONAL MORTAR AND SUPPLY CO., with main offices in Pittsburgh, Pa., has a plant at Cold Springs, O., five miles from Springfield, that is certainly a model for cleanliness in operation. Besides having an excellent hydrated-lime plant here, the company has a model crushing plant, electrically operated throughout. The stone is almost a pure dolomite, analyzing 55 per cent calcium carbonate (Ca CO_3) and 44 per cent magnesium carbonate (Mg CO_3). The capacity of the hydrating plant is 125 tons per 10-hr. day, and that of the crushing plant is 1,000 tons crushed stone per 10-hr. day.

Quarry Operation

The quarry face is about 1,100 ft. long and 33 ft. high. The rock shows no bad fissures and seams and is unusually free from clay seams. The drilling is all done by an electric well drill cutting a 5-in. hole. The holes are usually drilled 12 ft. back from the face and 12 ft. apart. Sufficient dynamite is used to break up the stone considerably, and consequently very little "pop shooting" has to be resorted to.

After the rock is broken into sizable fragments, it is hand-loaded into $2\frac{1}{2}$ -cu. yd. side-dump roller cars. These cars are of 36-in. gauge and when three or four have been loaded, the haul to the foot of the incline is made by a gasoline locomotive. The haul is a short one, and the gasoline locomotive operates efficiently and effectively. From the foot of the incline the cars are hauled up to the kilns by means of an electric hoist operated by a 45-h. p. motor. The spalls, or stone too small for the kilns are also loaded into the same type cars, and hauled by the locomotive direct to the crusher hopper where it is sized for fluxing and road purposes.

The Kilns

The kilns consist of two batteries of five kilns each, each kiln having a circular cross-section of $6\frac{1}{2}$ -ft. diameter and a height of 30 ft. They are lined with clay fire brick in such a manner so as to obtain the best results from the coal, which is used for fuel. The kilns have rectangular concrete shells, which at the tops of the kilns serve as hoppers, capable of holding a supply of stone in addition

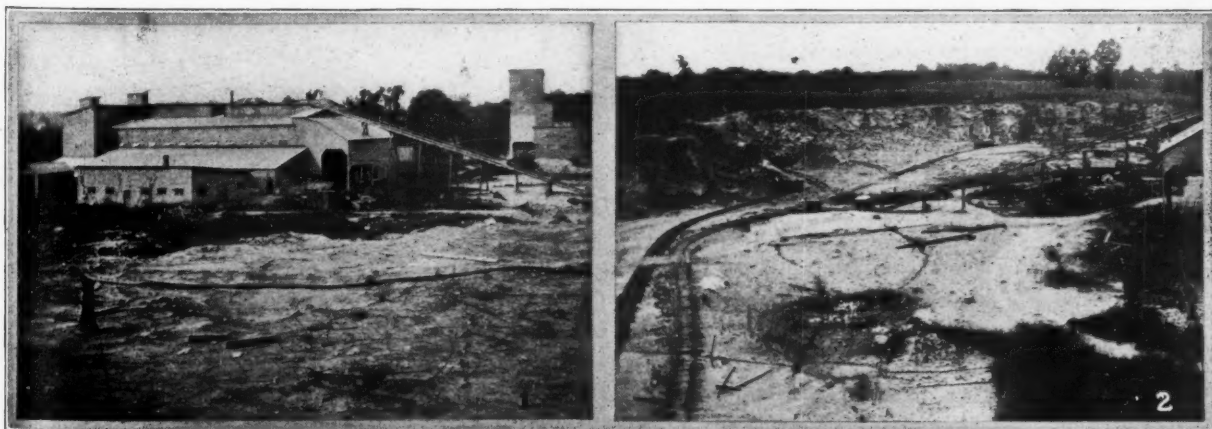
to what the kilns themselves will hold.

On each side of the kilns is an ample furnace with ashpit and special door, as shown in one of the accompanying views. The doors instead of being the usual swing type, are raised and lowered over pulleys by means of a dead weight. The extreme heat of the kilns here caused expansion and contraction of the hinges of the swing doors formerly used, thereby shortening the life of the door. It was found that by suspending the door over two pulleys and counter-balancing it by means of a concrete counter-balance, the problem was readily solved. The kilns are equipped with "McGinty" shaking grates.

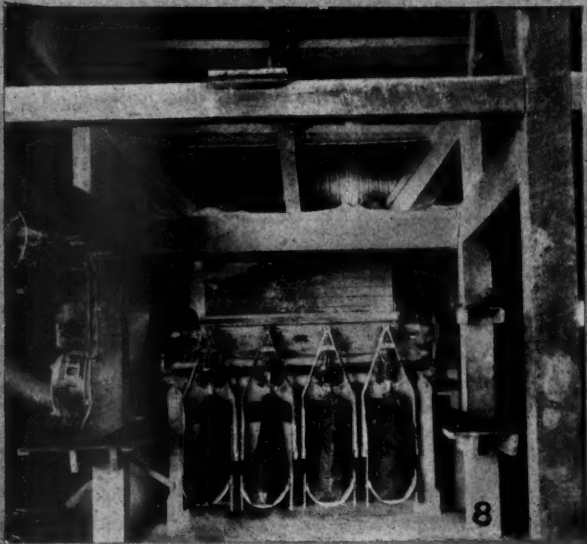
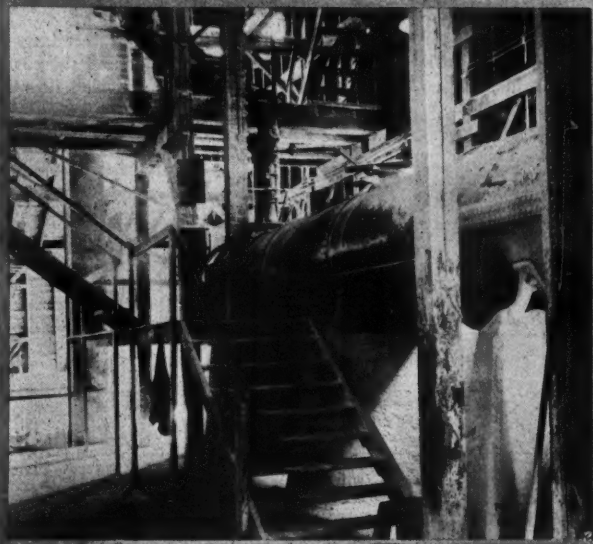
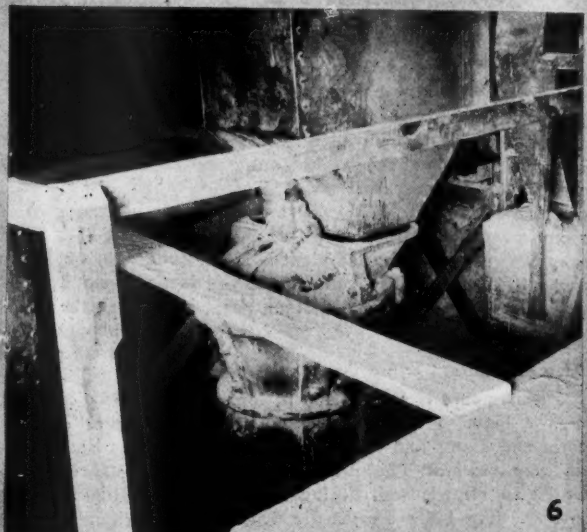
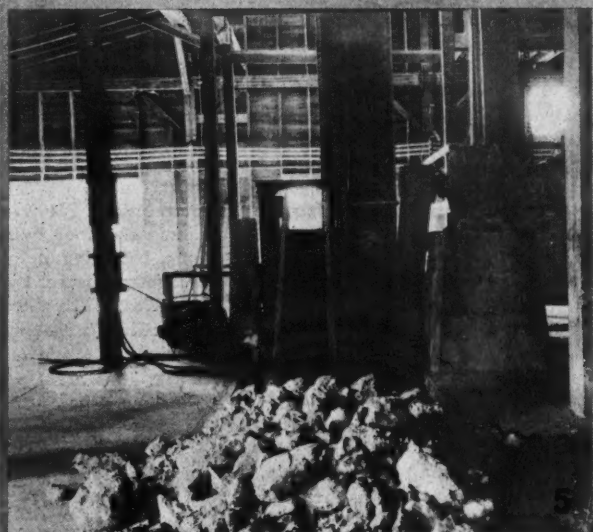
Suspended beneath the kilns are steel coolers into which the lime drops after having passed the fire zone. The lime is drawn from the coolers through draw shears operated by means of a lever. The kilns are drawn every four hours.

Process of Conveying, Elevating, Hydrating and Sacking

After the lime is drawn it is allowed to cool on the concrete floor and the core is taken out. It is then shoveled into a



1—General view of plant. Note concrete kilns. 2—Quarry face and incline to kilns. Track to crushing plant



3—Top of kilns. 4—Cooling floor. Drawing shears for kilns. 5—Pan conveyor to pulverizer, enclosed elevator to hydrator. 6—Sturtevant pulverizer. 7—Lauman hydrator. 8—Bates 4-valve bag packer; feed hopper overhead

12-in. underground pan conveyor, which is operated by a 15-h. p. motor. The pan conveyor moves the lime up an incline of about 30 degrees and deposits it into a Sturtevant pulverizer having a capacity of 10 tons per hour. The pulverizer is run by a 40-h. p. motor.

From the pulverizer, the ground lime is elevated to a storage bin and it is then ready for hydration. This bin is directly over the Lauman patented hydrator, and the ground lime is fed by gravity, through a feed-roll, into the hydrator. The hydrator is operated by a 10-h.p. back-gear motor.

After the process of hydration, the lime is elevated to a screw conveyor operated by a 15-h. p. motor and is conveyed to a Raymond mill, where it is air-separated and all the tailings and impurities are removed. From the mill it is forced by exhaust fans to a bin underneath of which

is a four-tube Bates valve bag packer. Here it is put into 50-lb. paper sacks automatically weighed and put in storage or loaded into cars for transportation. The bagger is run by a 7½-h. p. motor. A 12-in. exhaust fan is also run off the same 7½-h. p. motor, and is connected to the bagger, thereby removing all the dust and depositing it back into the bins.

Operation

The process of lime manufacture is carried on during the day only, although the kilns are, of course, in operation 24 hours a day, seven days a week. Barring a little hand-shoveling, the process here is almost automatic, the chief aim of the company being to do nothing by hand that a machine can be made to do.

The company has extensive plans for improvement of the present plant. The kilns, as explained before, which are of

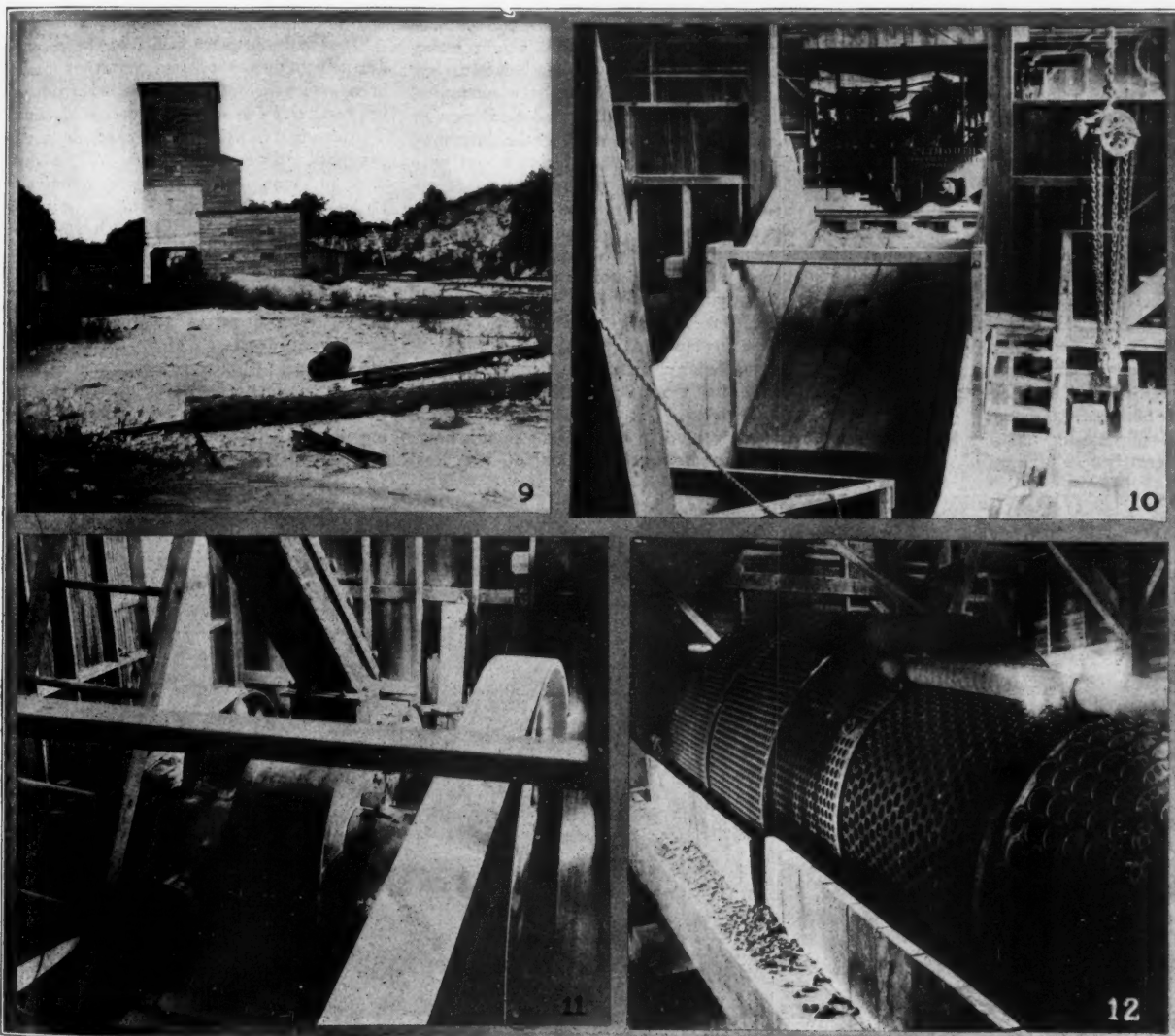
circular cross-section, will be re-built so as to be of elliptical cross-section.

It is claimed that such kilns will be much more efficient than circular kilns. Also the company plans the installment of another complete unit, which will mean another hydrator, mill, etc. It is also planned to place a steam shovel in the quarry and do away with hand-loading.

Crushing Plant

As stated before, because of the high quality stone here, the company finds a ready market for its product, most of which is sold for fluxing purposes.

A No. 6 gyratory crusher is located on a level with the quarry floor and it receives the stone from the hopper as shown in one of the accompanying views. The stone is reduced to a 3-in. size, and on leaving the crusher it is taken up by a 6x18-in. bucket elevator, of 85-ft. centers,



9—Crushing plant. Note concrete storage bins. 10—Chute to gyratory crusher. 11—Rolls for fine reduction or recrushing. 12—Rotary screen for sizing stone

and deposited in a hopper which feeds a jacketed sizing screen. Three separations are made here, namely, dust to $\frac{1}{4}$ -in., $\frac{1}{4}$ -in. to $\frac{3}{4}$ -in., $\frac{3}{4}$ -in. to $1\frac{1}{2}$ -in., $1\frac{1}{2}$ -in. to $2\frac{1}{2}$ -in. and 3-in., the different sizes of stone going by gravity to their respective bins. There are five bins all together, each having a capacity of 150 tons.

The rejections from the sizing screen are chuted to a set of 48-in. rolls, which reduce the stone to $\frac{3}{4}$ -in. size. From the rolls it is again taken up by the elevator aforementioned and the same operation is again repeated.

The crushing plant is operated by two motors. A 40-h. p. motor operates the crusher and rolls, while another 25-h. p. motor operates elevator and screen. The crusher and rolls are set on concrete foundations. The company buys its power from a local company, taking it in its transformers at 2,300 volts and reducing it to 220.

Although the crushing plant is a simple one, it is modern, very compact, and one that has facilities for smooth operation. The bins holding the stone are constructed of reinforced concrete and the cars are loaded directly underneath.

Organization

The National Mortar and Supply Co. also operates a plant at Gibsonburg, O., which produces a white finishing lime. The lime produced at Cold Springs is a mason's lime and agricultural lime plant.

The officers of the company are as follows: A. H. Lauman, president and general manager; Alex Gilliland, vice-president and treasurer; Wm. F. Stolzenbach, secretary and assistant treasurer; A. H. Lauman, Jr., assistant to the president and purchasing agent. John Hanes is superintendent of the Cold Springs plant.

Federal Trade Commission on "Open-Price Competition"

PRESIDENT HARDING, in his message to Congress, referred specifically to a report of the Federal Trade Commission on certain activities of trade associations. The part of the report referred to reads as follows:

"One of the purposes of these organizations nominally is to determine uniform cost accounting methods and to steady the market by furnishing the supply which it can readily absorb. These associations collect and publish for the benefit of their members figures of production, production costs, sales and sales prices, and orders and stocks, in pursuance of a plan whereby the members of such associations are to compete among themselves and with others with knowledge of their own and their competitors' production costs and prices, the available supply and the demand.

"The collection and public dissemination of such statistical data might make the operation of such associations of benefit to the producer and the consumer alike, but unfortunately the tendency is here manifested to confine the information to members and to bring about uniform prices and to maintain them at an artificially high level by curtailing production or supply through action which tends strongly toward uniformity because based upon common information, but which purports to lack the element of concerted agreement forbidden by the Sherman law.

"Too many distributing units are engaged for most economical handling of the business. But the result which would normally tend to come from such a condition, namely, elimination of the less

efficient through competition, is checked in many lines, especially in the retail distribution, by a friendly or so-called 'ethical' tempering of competition. The effect of this is to maintain prices or to respect territory and to keep many inefficient or unnecessary units in business. These conditions tend to retard the price readjustments, now urgently needed for a resumption of normal business.

"It is apparent, therefore, that forces which tend to retard a reduction in price to the consumer may be and are being applied to every stage of the previous operations. No one stage is wholly free from the operation of such forces. The manufacturer, the jobber and the retailer are able to resist price reduction more effectively than the producer of raw food products, for generally speaking, they are more closely organized, have better credit facilities and, on account of their location enjoy superior advantages in transportation and storage.

"It may be broadly said that the recent declines in prices of raw materials have been uneven, but have resulted from a very general but likewise uneven decline in consumptive demand for manufactured products," the report added. "This decline in demand, due partly to a buying strike and partly to a limitation of buying power, though starting with the consumer, has affected raw material prices to a greater extent than it has yet affected manufacturers' or wholesalers' prices. Retail prices to the consumer have been least affected. Apparently, where retail prices were cut to any extent buying commenced to pick up, but if this was made the occasion for again increasing prices the resumption of demand was again checked."



13—Firing floor for kilns. Note shaking grate. 14—Storage space for bagged hydrated lime



General view of quarry and plant of the Oliver Silica Sand Co., Massillon, Ohio

A Typical Silica Rock Operation in Ohio

Oliver Silica Sand Company, Massillon, Produces Steel Molding Sand, Core Sand, Etc.

OHIO, already recognized as one of the leading limestone producing centers in the United States, is also one of the leading silica rock producers, especially in the line of molding sand, furnace sand, blast sand, and a good portion of glass sand. In 1918, Ohio was third in production of molding sand in the United States, and sixth in glass sand produced. According to preliminary estimates it is hardly possible that Ohio exceeded that rank in 1919, as it only operated on a 33-per cent basis then.

Molding sand is used for casting molten metal, and is of many kinds. There are, however, three main classes, steel, iron and brass molding sands. Each class includes several varieties of sand, the particular variety used depending on the size and weight of the casting, and the position occupied in the mold. It can be easily seen from this how important the silica sand industry is to the iron and steel industry.

In the bulletins of the United States Geological Survey, steel molding sand is classified as a white or yellowish clear quartz sand high in silica. It has no bond, and in order to make a mold with it, a small quantity of fire clay, molasses water, or other material is added for binder. The size of grain, or fineness, varies with the work to be done.

Grinding, polishing and blast sands, also play an important role in the metal industry. Blast sand is a clear, tough, uniformly-sized sand, with either round or angular grains, which is driven by compressed air through a hose for such purposes as cleaning metal castings. In foundries where heavy metal castings are made, it is used to clean off parts of the mold that adhere to the casting.

Fire or furnace sand is a highly re-

fractory silica sand used for lining furnaces and ladles used to contain molten metals, and so has an important place in the foundry.

At the plant of the Oliver Silica Sand Co., about one-half mile from Warwick, Ohio, one is afforded the opportunity to get an idea as to the general methods used to obtain and manufacture all the sands above mentioned.

This company was organized in 1908, and is now one of the largest producers of sand for foundry purposes in Ohio, its production since 1916 being as follows:

Year	Tons Produced	Valued at
1916	36,484	\$34,689
1917	46,880	49,789
1918	42,660	70,049
1919	21,763	45,800

The peak of production was reached in 1918, due to the fact that the steel mills were busy on war orders, as were also all of the metal foundries. In 1919 and 1920 there was a great decrease due to priority orders and railroad conditions.

Silica Rock Deposit and Operation

The present quarry of the Oliver Silica Sand Co. is being worked in a crescent shape and has a face ranging from 25 to 55 ft. in height and about 1,400 ft. in length. The company owns an area of 140 acres of silica rock deposit here, which analyzes 98.32 per cent silica dioxide (SiO_2), 0.68 of one per cent alumina, 0.43 of one per cent iron, and 0.11 of one per cent magnesia. The quarry is covered by an average of 6 ft. of overburden, consisting mostly of clay, which is stripped by a 15-ton steam shovel with a $\frac{5}{8}$ -cu. yd. dipper. It is loaded into dump wag-

ons, and hauled to the dumping pile by horses.

A well drill cutting a 6-in. hole is used for blast holing. The holes are drilled 15 ft. back from the face and 15 ft. apart, each row of holes being staggered. About 3,000 lbs. of dynamite is used in one shot, Cordeau-Bickford being used as a detonator. The nature of the silica deposit here is such that on blasting it is fairly well shattered, and very little "pop shooting" is necessary. The stone is loaded by hand into $1\frac{1}{4}$ -cu. yd., 36-in. gauge, end-dump cars, and the haul to the foot of the incline, a distance of 500 ft., is made by mule. The company has recently installed a 30-ton steam shovel with a 1-cu. yd. dipper, for loading broken rock in the quarry instead of the present method of hand-loading. The mule will also be done away with as a means of transportation and a dinkey locomotive substituted in its stead.

Crushing Plant

As the cars reach the incline they are hauled up the tramway by cable and dumped into the crusher automatically, the stone falling into a 24x36-in. jaw crusher, where it is easily segregated, the crushed particles being picked up by a short (11x6) bucket elevator, and deposited into a hopper feeding the rolls. There are two sets of finishing rolls, one set being located beneath the other, so that the sand from the first set falls into the second set, where it is re-ground. Underneath the second set of rolls is a conveyor belt, by which the sand goes direct to the cars or to a storage bin of 800 tons capacity. This sand is used for general foundry purposes, and core work.

Drying and Screening

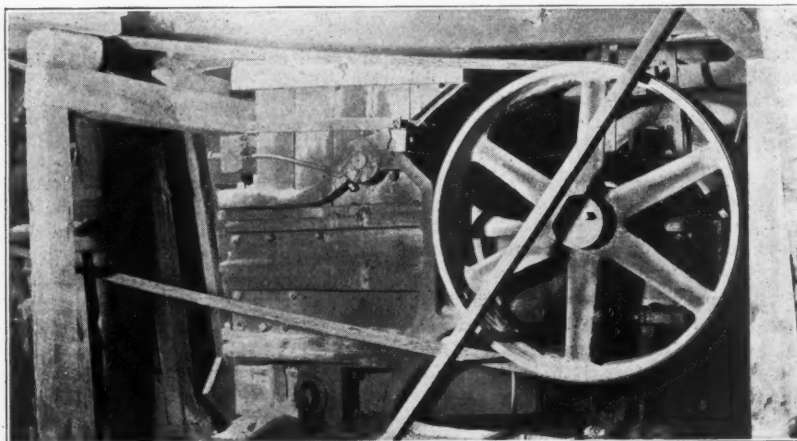
For furnace or fire sand the material goes again by conveyor belt to a hopper

leading to passage through the rotary dryers. The rotary dryers, of which there are two, are 5 ft. in diameter and 35

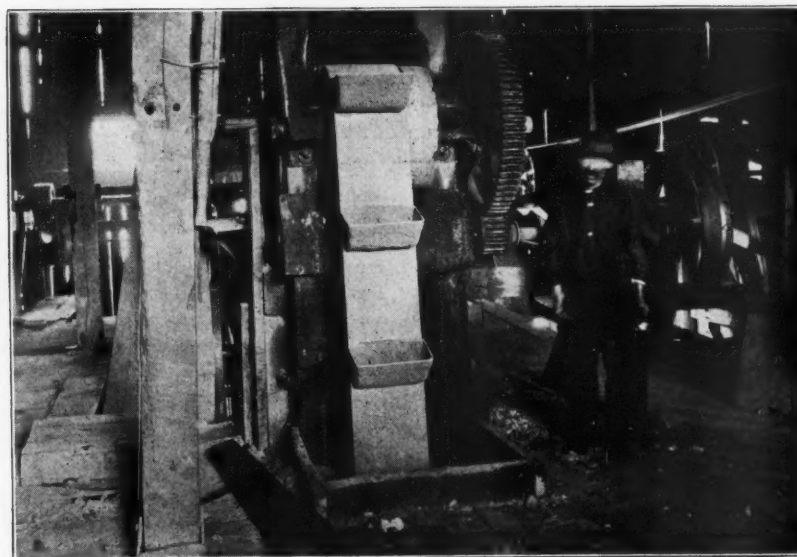
ft. long, and are fired by coal. The material entering the dryer is cascaded around by means of baffle plates, until it is thrown out of the discharge end, thoroughly dried. The hot sand from the first dryer is reclaimed by a small bucket elevator and deposited in a pit, where the hot sand from the second dryer is also discharged. It is reclaimed from this pit by an (11x6) bucket elevator and deposited over a gravity "piano-wire" screen. This screen is replaceable and any degree of fineness can be obtained by simply replacing the screen. From the screen it is chuted either direct to cars for shipment or to a storage bin capable of holding 1,000 tons of sand. The tailings from the screen are chuted back to the finishing rolls and the process is again repeated. The plant has a capacity of 300 tons per 10-hr. day.



Quarry side of crushing and grinding plant



Initial jaw crusher of grinding plant



Bucket elevator from crusher to bins

Power Plant

The entire motive power for all machinery is furnished by steam generated in either of two boilers, 175-h. p. and 125-h. p., respectively, running a 100-h. p. straight-line steam engine. This engine runs the shaft lining to which all other machinery is belted. A small dynamo which generates enough electricity for lighting purposes in the plant is also belted to this main power unit.

The company is particularly fortunate, in that it has absolutely no difficulty in obtaining coal, as there is a coal mine within the close proximity, enabling it to haul all coal by means of trucks, thereby getting away from a serious factor that has hampered production in most other plants in 1920, namely, lack of fuel.

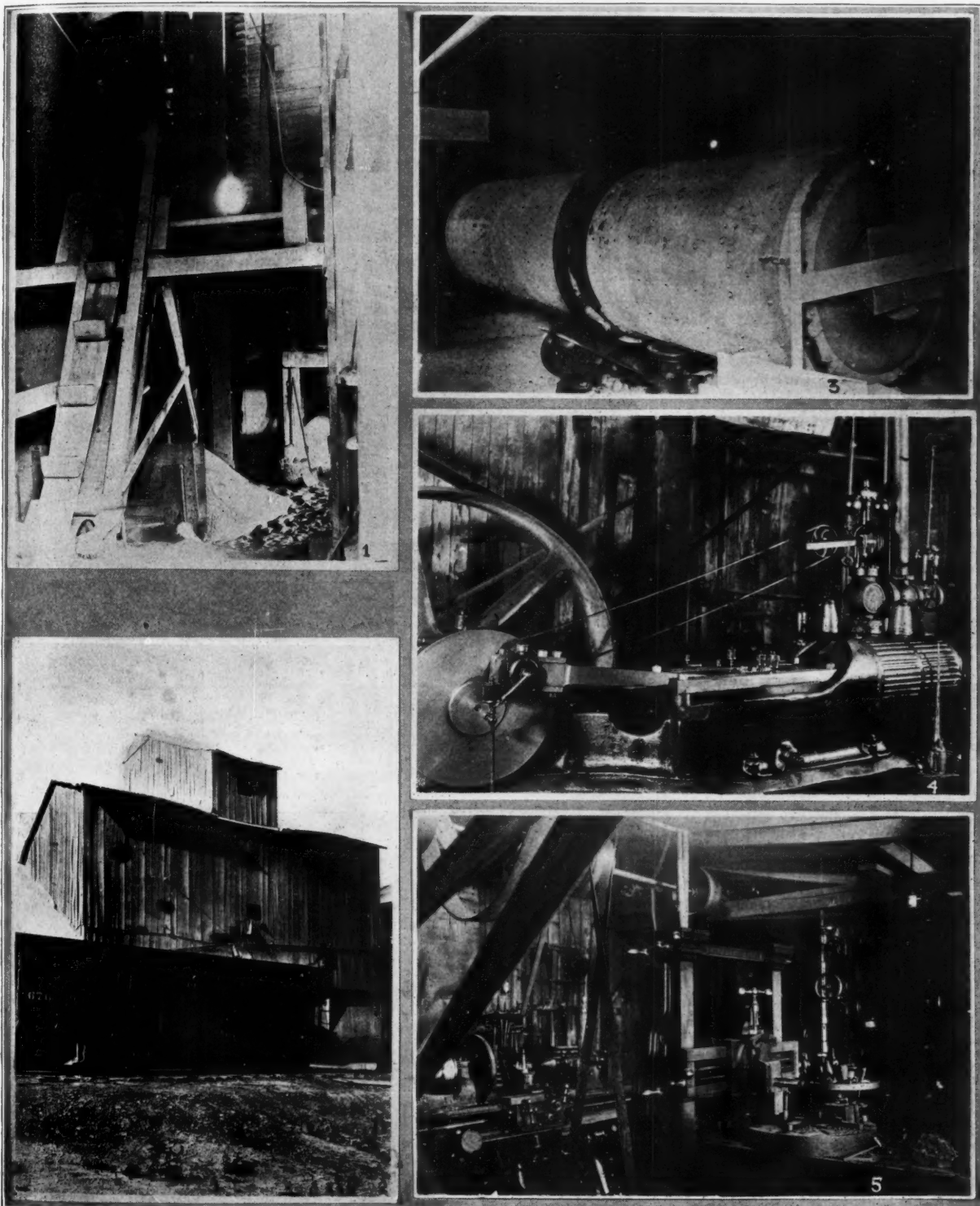
Complete Machine Shop

This company being located near a small village, where it is impossible to get complete repairs on broken machinery readily, has installed a complete and separate repair department, in charge of an expert mechanic. Besides a blacksmith shop, there is a complete machine shop containing a power hack-saw, 24-in. planer and shaper, 30-in. radial drill, and a 20-in. engine screw lathe. All this machinery is driven from line shafting run by a 5-h. p. steam engine.

New Plant

As stated before the demand for sand was so great during the war that the company built an additional plant of 150 tons capacity per 10-hr. day. This new plant is equipped with a 125-h. p. water-tube boiler generating steam for a 100-h. p. straight-line engine. The cars are hauled up a tramway by cable line, as in the old plant and dumped automatically into a No. 15 jaw crusher. From the crusher the material is chuted to a bin, and from here by gravity to two sets of finishing rolls. The sand leaving the rolls is reclaimed by a bucket elevator, which deposits it over a piano wire screen. The

Interior Views of the Oliver Silica Sand Company Plant at Massillon, Ohio—A Typical Ohio Silica Operation



(1) Interior view of elevator and crusher-feeding hopper; (2) Shipping side of plant; (3) Dryer; (4) Power plant—straight-line steam engine; (5) Machine shop, showing full and complete equipment

screened sand then goes direct to cars or to a storage bin. The total aggregate storage of both plants is about 4,000 tons.

Personnel

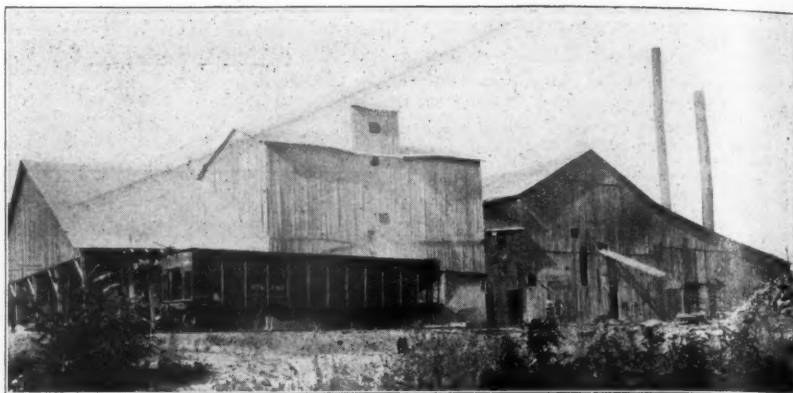
The Oliver Silica Sand Co. has its executive offices located at Massillon, Ohio, and is incorporated for \$35,000. The officers of the company are as follows: E. B. Fritchman, president; I. N. Rhodes, vice-president; H. D. Leonard, secretary-treasurer and general manager; J. L. Reeves, assistant general manager, and F. I. Geis, superintendent.

Depreciation Table for Equipment Used in Gravel Pits and Quarries

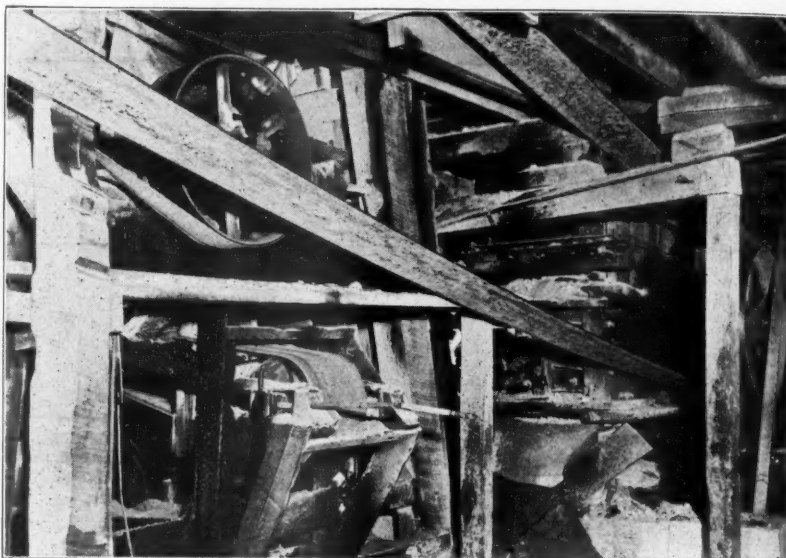
THE TABLE HEREWITH is taken from one prepared by the Associated General Contractors for arriving at a fair rental schedule for construction contractors' equipment and machinery. The original table contains in addition to the items given herewith, interest at 6½ per cent per annum, storage incidentals, insurance and taxes.

Items of Equipment	Yds.	Economical Life	Depreciation %	Shop Repairs %	Field Repairs %
Auto-truck	3	25	20	20	
Auto-trailer	5	15	6		
Boiler, upright	8	9½	20		
Boiler, locomotive	8	9½	15		
Bucket, clam shell	4	18¾	15		
Bucket, orange-peel	4	18¾	25	6	
Bucket, drag-line	4	18¾	12	3	
Cars, steel dump	6	12½	8	4	
Cars, wood dump	5	15	7	3	
Cars, flat	8	9½	4	3	
Cars, hopper	5	15	8	3	
Compressor, steam	7	10¾	6	3	
Compressor, gasoline	4	18¾	6	7	
Compressor, electric	6	12½	3	3	
Conveyor, belt	2	37½	7	6	
Conveyor, bucket	2	37½	10	6	
Crusher, rock	6	12½	5	3	
Derrick, wood	5	15	4	4	
Derrick, steel	10	7½	4	3	
Dragline, steam	6	12½	9	8	
Dragline, gasoline	4	18¾	10	10	
Dragline, electric	8	9½	7	7	
Drill, traction well	6	12½	7	10	
Drill, tripod	4	18¾	7	10	
Drill, jack hammer	4	18¾	7	6	
Engine, gas	6	12½	8	8	
Engine, steam	10	7½	5	5	
Excavator, cableway	6	12½	4	12	
Hoist, steam	10	7½	6	4	
Hoist, gasoline	6	12½	7	8	
Hoist, electric	8	9½	5	3	
Locomotive, Indus. steam	9	8½	6	4	
Locomotive, Indus. gas	4	18¾	13	10	
Locomotive, Stand. gauge	10	7½	6	4	
Locomotive, crane, steam	8	9½	7	8	
Locomotive crane, elect	8	9½	6	4	
Motors	6	12½	6	4	
Pump, centrifugal	8	9½	6	4	
Pump, piston	6	12½	7	5	
Pump, impulse	8	9½	2	4	
Rails	8	9½	5	3	
Rock channeler	6	12½	7	8	
Shovel, steam	6	12½	9	7	
Shovel, gasoline	7	10¾	6	5	
Shovel, electric	3	25	3	3	
Switches, fabricated	7	10¾	3	4	
Tower, steel hoist	7	10¾	3	4	

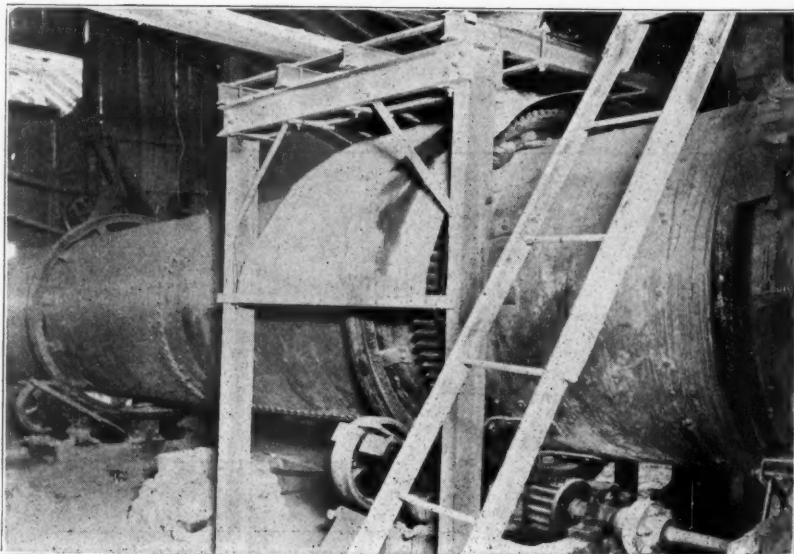
This table gives then the estimated life of the equipment, and the amount to charge off annually for depreciation and repairs in percentage of the original cost of the machine. It should prove useful to quarry and pit operators in estimating the cost of their operations.



General view of the loading side of the plant



View under the sand rolls



Dryer of crushed silica rock

Hydraulic Methods of Handling Quarry Overburden, Sand, Gravel

Governing Considerations and Principles Employed in Hydraulic Mining, So-Called

THE HYDRAULIC METHOD of mining is fast coming to the front as one of the most economical methods for handling large volumes of earth or other loose material, especially in the stripping of overburden of quarries and gravel pits.

The development of hydraulic mining as practiced at present is contemporary with the development of hydraulic dredging, and only became possible with the development of modern dredging pumps. The hydraulic gold mining as practiced in the early days in California can hardly be considered as such in the modern sense of the word, as it dealt only with one part of the problem. This distinction will be explained later.

Reduced to its simplest terms, hydraulic mining may be said to consist of two distinct steps, or operations. (A) Breaking up and washing down the material with jets of water. (B) Disposing of the mixture of material and water, either by sluicing or pumping. These steps may be considered analogous with the digging and the hauling of the material in steam-shovel operation.

Considerations Governing Adoption of Hydraulic Method

In considering the adaption of hydraulic mining to any particular piece of work, the following points should be carefully investigated:

1. The character of the deposit.
2. The rate at which it is desired to mine the material.
3. The water available for operating the nozzles, and the height and distance which it will be necessary to pump it to the nozzles.
4. The method of disposal of the material, and the height and distance to which it will be necessary to deliver the material.
5. The kind of power to be used.

Treating these points in detail in the order given, we shall first consider the character of the deposit, which is the most important item of all. The matters to be ascertained in studying the deposit may be given as follows:

- A—Nature of the material; that is, whether sand, gravel, clay, etc.
- B—The hardness of the material.
- C—Sizes in which the material occurs.
- D—Depth of the deposit.
- E—Character of the underlying strata.

By Victor J. Milkowski

Engineer in Charge, Dredge Department,
Morris Machine Works, Baldwinville, N. Y.

The Nature of the Deposit

The nature of the material and its hardness or softness determine the pressure which will have to be employed at the nozzle in order to break up and to wash down the material in proper quantities. On account of the great variations encountered in nature, this can best be determined experimentally by observing the effect of a jet of water under different pressures on the material in question, in its natural formation. For ordinary compact earth, a pressure of 50 lbs. per sq. in. at the nozzle is sufficient; while, in stiff clay and conglomerate, a pressure of 150 lbs. per sq. in. may be required.

The sizes in which the material occurs is important where it is necessary to pump the material to its destination as the dredging pump must be designed with sufficient clearances to pass the sizes which it is ordinarily proposed to handle. Naturally, large boulders cannot be handled at all—either by sluicing or pumping.

The depth of the deposit is important from its bearing on the unit cost of handling the material. Other things being equal, the deeper deposits can be handled more economically on account of less loss of time for the moving of the equipment and because of the more effective action of the nozzles.

The nature of the underlying strata is important as it forms the floor of the pit where the equipment is located, and the material sluiced. Naturally, a very soft strata, or one with very irregular surface would render the operations difficult. If the underlying strata is very porous, it will permit the escape of some of the water used in washing down the material and may leave insufficient water for sluicing and pumping. An ideal condition in this respect is where the underlying strata is either hardpan or rock, with regular surface and sloping away from the face of the deposit.

Capacity Considered

The next point to be considered is the desired capacity, or the rate at which it

is proposed to mine the material. This will, of course, determine the sizes of the equipment to be used. The most common and practical sizes for this class of work are the 10-in. and the 12-in., these being the sizes of the dredging pumps and pipe used for pumping the material. The capacity of a 10-in. dredging pump is ordinarily rated at 90 cu. yds. per hour of solid material, and that of a 12-in. pump at 125 cu. yds. per hour. These capacities are subject to considerable variation, depending on the conditions under which the work is carried on. Other things being equal, the larger equipment is more economical.

The next point to be considered is that of the available water supply for the nozzles. To wash down the material and subsequently transport it to its destination, the amount of water required is approximately 10 times the volume of material moved. A 10-in. pump requires about 2,800 g. p. m., and a 12-in. pump about 4,000 g. p. m.

The height and the distance to which it will be necessary to pump the water to the nozzles, together with the pressure required at the nozzles, determine the total head against which the pump, supplying the nozzles, must operate. These items should, of course, be kept down to the minimum to reduce the power cost.

It frequently occurs that a sufficient amount of water is not available. In such a case it can usually be arranged to use the waste water over again after the material has been deposited at its destination, and the water allowed to become clarified by a proper arrangement of sedimentation basins.

Handling the Sluiced Material

The fourth point to be considered is the disposal of the material after it has been washed down from the bank. Where the material itself is the object sought after, as in mining, the disposal of it is, of course, determined in advance. In stripping, however, the disposal of the material offers a considerable problem and must be studied out carefully. Ordinarily in a stripping operation it is found necessary after washing down the material to pump the resulting mixture of water and material into suitable basins, or spoil areas, where the solid material settles out and the water is allowed to run off. As explained before, the volume

of this waste water will be about 10 times the volume of the solid material. The construction of spoil areas is bound to be expensive; and, where abandoned pits can be used for this purpose a considerable saving can be effected.

The height and the distance to which it will be necessary to pump the material determine the total head against which the dredging pump must operate, and should be made the minimum possible to save power and wear on the pump. When the required total head exceeds that allowable for one pump, additional pumps are used in the line as boosters. In special cases the material can be sluiced direct to destination without the use of dredging pumps. This, of course, is far preferable to pumping; but it can only be used where the location of the spoil areas and the surface of the underlying strata permit of a sluiceway with a uniform slope of about 3 or 4 per cent.*

The hydraulic gold mining in California referred to in the beginning of this article was of this character; that is, the hillsides would be washed down with monitors and the resulting mixture of material and water would be sluiced down to wherever it would go, the gold being recovered in the sluiceway.

Power Required

The fifth item to be considered is the source of power for operating the pump. In the great majority of cases, electric current is to be preferred for this purpose; and, in many cases, the electric current is the only practical source of power.

While the pressure pumps supplying the nozzles can usually be made stationary and the excavation can be followed about with lightweight pipe, the dredging pump, on the other hand, must usually be moved about in order to follow the excavation. For this reason a self-contained pumping unit, consisting of a direct connected motor-driven dredging pump mounted on portable platform is to be preferred. The engine-driven pump, on the other hand, is heavy and cumbersome in comparison and must be followed about by a steam line. In special cases where the surface of the underlying strata permits of sluicing the material to the dredging pump for considerable distances or where the bank is of a great depth so that the dredging pump needs to be moved only at rare intervals, the foregoing objections to steam power are not of such great importance.

Example in Florida

To illustrate the foregoing discussion we shall employ a short description of an actual example as practiced in the Florida phosphate fields. A detailed de-

scription of the operations there was contained in the Rock Products issue of January 31, 1920.

The phosphate bearing strata in the pebble fields in the vicinity of Tampa, Fla., consists of about 20 ft. of conglomerate mixture, containing the phosphate pebbles; this being overlaid with about 15 ft. of sand, clay, etc., and underlaid with a uniform strata of limestone. Both the stripping and the mining of the phosphate rock are done by hydraulic methods. In the case of the stripping operation, the material is pumped direct to spoil areas, whereas in mining, the material is pumped to a separating plant where the phosphate rock is separated out and the debris is then pumped to spoil areas.

The material is washed down from the bank with the monitors, and sluiced to the sump, from where it is picked up by the dredging pump suction. The giants are of the standard double-jointed type and are furnished with nozzles, varying

from 1½ to 2 in. The pressure at the nozzles varies from 100 to 150 lbs. per sq. in. Water is supplied to the nozzles by a motor-driven centrifugal pump, taking the water from a pool near by.

Ordinarily the giants are used in pairs; the third giant being used as a reserve and for sweeping any material not reached by the other two. The stream from the giants is played at the foot of the banks in order to undermine it and to cause the material to cave in. To sluice the material to the sump, ditches are cut either with the nozzles or by blasting. The dredging pump is of a standard design, 12-in. diameter suction and discharge, directly connected to a 300-h.p. 600-r.p.m. motor.

The suction, starting at the pump, consists of a length of rubber hose to secure the necessary flexibility, a suitable length of pipe, a check valve used in priming a 45-deg. elbow and another length of rubber hose with a 45-deg. elbow attached

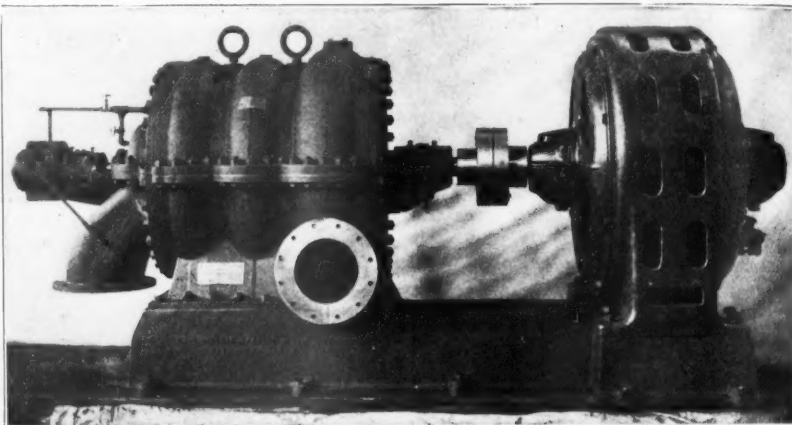


Fig. 1. Centrifugal pump, directly connected to motor. Used for pumping water

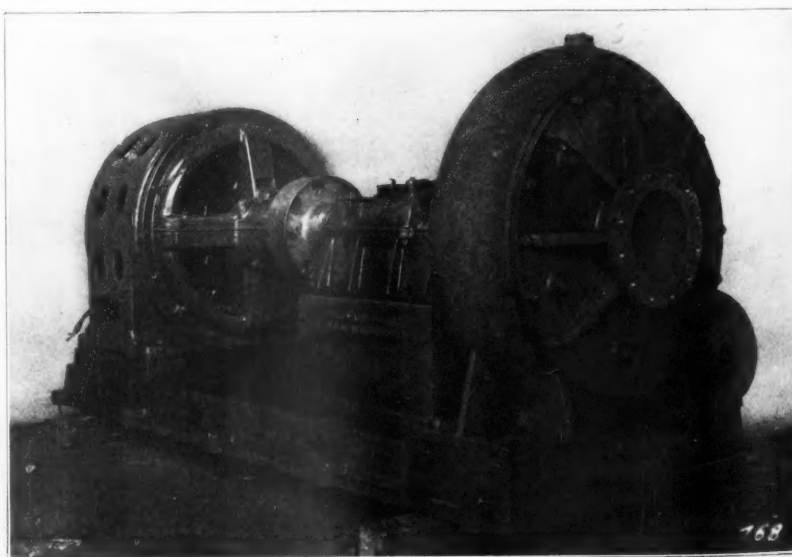


Fig. 2. Dredging pump, directly connected to motor

*Experience at Seattle with sand and gravel shows the slope should not be less than 12¼ per cent—about 7¼ deg.—Editor.

to the bottom. The hose and elbow on the bottom are supported by tackle blocks from a tripod set over the sump so that the amount of material picked up by the suction can be regulated by raising and lowering the end of the suction hose. By varying the length of the suction line by working the suction around, it is possible to clear up all material within a radius of about 200 ft. from the pump.

Fig. 1 illustrates the type of centrifugal pump, directly connected to motor, used for supplying water to the giants. Fig. 2 illustrates the type of dredging pump, directly connected to the motor, used for pumping the material to its destination. Both of these units are light, compact and self-contained and can be easily moved about.

Conclusions

Hydraulic mining being a highly specialized process is dependent for its success to a high degree upon being employed under proper circumstances. Wherever the conditions are correct for its use, no other method can compare with the hydraulic method for excavating and moving large bodies of material. The power costs with this system are relatively high, while the labor costs and the upkeep are reduced to a minimum. The whole method of hydraulic mining presents an example of the utmost simplicity and is but an application of the erosive and carrying action of water through which nature shapes and builds up continents.

Prohibitive "Delivered Price" of Agricultural Limestone in Illinois?

SIR—In your issue of May 7 is an article, "Why Does Use of Agricultural Limestone Increase So Slowly?"

In that article relating to the price of limestone in Peoria, Ill., is the following: "Thus \$3.00 a ton is looked upon as a prohibitive price for the material plus the freight in Illinois." Our limestone screenings are sold today at \$1.50 per ton at our quarry, plus a freight rate to Peoria of \$1.26 per ton, making the delivered price \$2.76 per ton.

The present freight rate is \$1.26 a ton, compared to the former rate of 70 cents per ton. Labor and material today is more than double that paid in 1917. The peak sales for agricultural limestone were in 1919, and the price for the year was 90 cents per ton, and the freight rate in that year was 70 cents per ton.

DOLESE & SHEPARD CO.

By J. F. Talbot, President.
Chicago, Ill., May 12, 1921.

Open-Price Competition

THE FEDERAL TRADE COMMISSION has recommended several remedies to force down prices of commodities, among which, aside from those that

might be afforded by improved transportation and credit facilities, as it pointed out, are the following:

The passage of a bill which will meet judicial objections to the authority of the commission to continue its efforts to obtain and publish information respecting the ownership, production, distribution, costs, sales, and profits in the basic industries more directly affecting the necessities of life—shelter, clothing, food and

National Lime Convention

THE THIRD ANNUAL CONVENTION of the National Lime Association will be held at the Hotel Commodore, New York City, June 15, 16 and 17. Please mark this on your calendar with a red circle, and make your plans at once to attend.

Every effort is being made to insure that this convention shall be the liveliest and most broadly interesting that has ever been held. It will be a three-day meeting; the first day being devoted to lime production problems; the second day to publicity and sales work; and the third day to the working machinery of the association to make it most effective for promoting the lime industry.

There will be free luncheons each day at noon, with a special speaker of national prominence at each. On the evening of the first day there will be a regular banquet a la New York style, first-class.

A special committee on entertainment, headed by former President W. E. Carson, with Senator McLaughlin and Mr. Hart of the staff as assistants, should be a guarantee that those features will be live, up-to-the-minute, and worth coming a long way to see and hear.

We want every lime manufacturer on the continent to be present, and everyone receiving this letter should constitute himself a special committee to see that his acquaintances in the lime industry are reminded of this convention and are urged to be present. Just remember, please, that while no one person may be able to pull a great weight, when that pulling power is combined with many others and organized in good team work, it is the power that moves all business activity and you have your part in it. Apply this to yourself and let us make this the most rousing convention the lime industry has ever known.

E. O. FIPPIN,
General Manager.

fuel—for the information of Congress.

Vigorous prosecution under the anti-trust laws, including a re-examination of the reviewable decrees already entered in such cases with a view to strengthen them to meet present conditions, including also a closer scrutiny of the so-called open-price associations, to ascertain whether under the guise of beneficial associations they are in fact violating the law. Examination of associations of distributors to determine whether violations of law exist, and whether any of the activities of such associations are not of public service.

The passage of measures aimed at the elimination of unnecessary reconsignment and brokerage operations, including also "gambling in futures." Pyramiding of reconsignments and of jobbing sales, while not possible in the present market conditions, was one of the causes of the buyers' strike, from which we now suffer, and may reappear whenever markets again become speculative.

Calling a conference of officials representative of the trading nations of the world to consider the question of clearing the channels of international trade so as to eliminate undesirable combinations and to promote fair competition.

The recommendations also call for protection of the farmers through co-operative associations of producers and consumers and against so-called closely organized elements.

The commission states that a fundamental difficulty at the present time lies in the fact that there is no complete information available to anyone with reference to the proper adjustment of manufacturers', wholesalers', and retailers' prices in any industry. It mentions its frustrated efforts, started in January, 1920, with the approval of Congress, to determine the production costs, etc., in basic industries, including iron and steel and coal. An injunction was obtained from the Supreme Court of the District of Columbia by the National Coal Association halting the commission's inquiry as to coal production costs.

"Well Seasoned" Artificial Stone or Brick

APATENT has been issued to a Mississippi man for an artificial stone or brick made with sand and cement, with certain interesting "condiments." It is described as follows:

"Artificial stone including, in approximately the proportions stated, five cubic feet of sand, three and three-quarters pounds red oxid of iron, two and one-half pounds plaster Paris, one and one-quarter pounds of ochre, one and a quarter pounds of salt, 10 ounces of sugar, and 95 pounds of cement."



Hints and Helps for Superintendents

Stripping a Sand Pit by Blasting

IT HAS BEEN COMMON PRACTICE for years to use dynamite for stripping top soil from iron ore beds, shallow coal deposits, stone quarries, etc., but it is unusual to blast the top soil from sand and gravel pits; yet the method is just as applicable to such work and saves as much time and labor in the one as the others.

A description of the method employed by the Washington Sand and Gravel Co. at its works near Bladenburg, Md., may be of interest to other producers of these materials.

The pits are located at the side of a creek or small river. The sand is loaded on boats by means of a floating suction dredge operated on the creek.

To get at the sand it is necessary to strip off 4 to 6 ft. of top. This stripping is now done by blasting with dynamite. A shot recently observed by the writer was loaded as follows:

Bore holes were put down vertically, 4 ft. deep, and located 8 ft. back from the creek bank. In this shot there were seven charged holes, 2½ ft. apart in the row.

Five cartridges of 40 per cent ammonia dynamite 1½x8 was the charge in each hole. Each charge was primed with an electric blasting cap and the firing done with a blasting machine.

The shot removed the top from the section blasted, throwing most of the dirt into the creek.

It is figured that the cost of the blasting is more than balanced by the saving in the time and cost of operating the dredge to remove the top. This work was all waste, because no use could be made of the top soil.

Washing Gravel in Bins

THE ACCOMPANYING illustration shows two methods for washing gravel after process is usually considered finished. The gravel is washed both in the bin and as it leaves the bin for loading into cars.

The bin is made of 2x4-in. timbers with a perforated steel plate on top and boards on the bottom, the whole resting on an earth fill. The gravel is sprayed with water from the spray pipes "A". This water passes through the perforations in the steel plate to the board bottom which conveys it to the trough outside the bins.

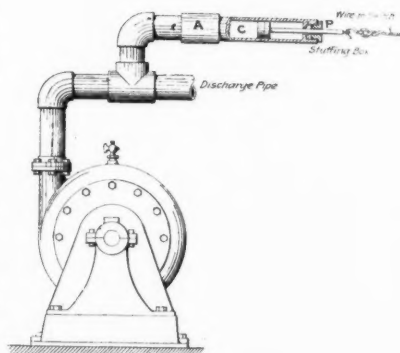
The spray pipe "B" washes the gravel as it leaves the bin for loading into cars. The housing "C" is made of wood with the ends boarded up so that there is only one opening "D" through which the gravel may pass. The housing is only as wide as the chute and there is one of these housings over each chute. The opening "D" is about 10x24-in.

Burton H. Atwood, president of the Interstate Sand and Gravel Co., devised these washing sprays and they are in use in his plant located at Libertyville, Ill. (described in Rock Products, May 7, 1921, pages 19-23).

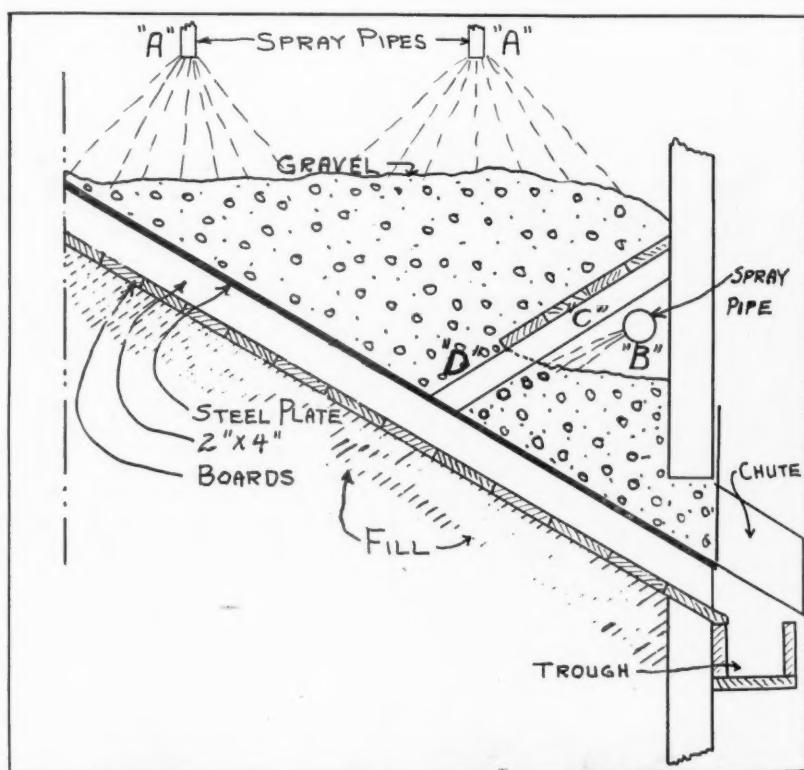
Automatic Pump Stop

A DRAINAGE PUMP INSTALLATION should be as nearly "fool-proof" as possible and should require no labor attendance except to start it when the sump is full. An automatic device should be installed to cut out the power and stop the pump when the sump is empty. Here the pumpman has a chance to exercise his ingenuity. The simplest

method is, of course, to put a float in the sump. The float is connected by a wire to the switch, and its movement down stops the motor. By properly adjusting the length of the wire, the sump need not be drained dry and there will be no need of priming the pump when it is started again, if it has a tight check valve on the suction pipe.



Automatic pump stop



Half-section of bin. Device for washing gravel as drawn into loading chutes

The method, however, is limited to those conditions under which the pump and motor are situated directly above the sump. It may happen that it is more convenient to have the pump and motor some distance away from the sump, with a long suction pipe running thereto. In that event another device can be used. The accompanying figure shows a satisfactory arrangement. The old pump cylinder "C" was threaded and screwed into the nipple "A." When the pump was throwing water, the pressure forced out the piston "P" to the end of the cylinder. The wire to the switch was then hooked onto the piston end. When the sump was empty and the pump started to run dry, the air pressure forced the piston back, and this pulled the switch with it. This scheme worked satisfactorily, but it was necessary to spend a few minutes in priming the pump each time that it was started.—William F. Boericke, in "Engineering and Mining Journal."

Feed Bins for Tube Mills

THE VIEW herewith shows a type of bin adopted by a Mid-West cement company for feeding the tube mills with dry material. These bins have a half elliptical section, on the order of the well-known V-bottom design. The material entering this type of bin will flow more readily than in other types. Also, the effective bin capacity is much greater, thus acting as a storage for the tube mills. This will prevent a shut-down in case of some minor adjustment being made in some part of the plant that would other-

wise necessitate a shut-down of the tube mills. It also insures a better mix when employed in the raw end of a dry process cement plant. The bin is placed longitudinally over the feeders for the tube mills, as the view clearly shows.

Crushed-Stone Chutes

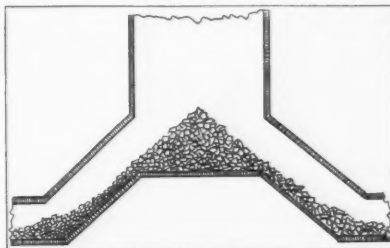
LINING STONE CHUTES is a serious problem at some crushing plants. At one of the Upper Hudson limestone plants of the New York Trap Rock Co. this problem has been solved by lining the chutes with crushed stone.

The sketch herewith conveys the idea, although it is not true in detail, as the inclines shown in the chutes are not, of course, steep enough to cause the crushed stone to flow freely. This is something that has to be determined for the material under consideration, but somewhere around 45 degrees from the horizontal is about right.

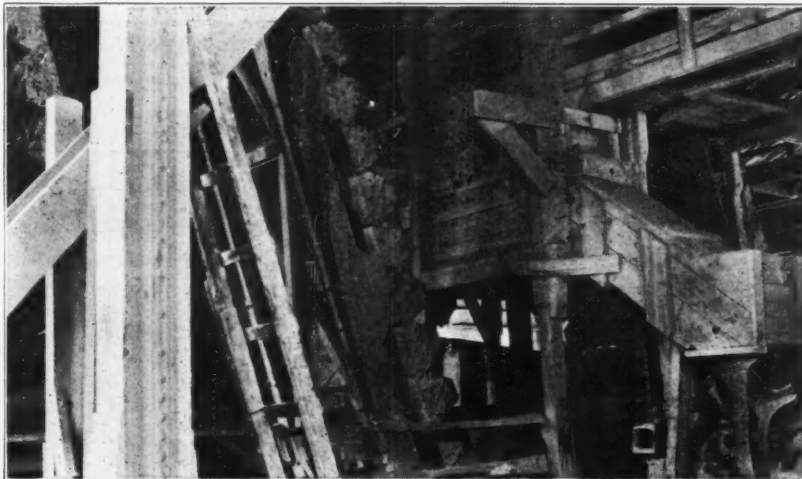
The chutes themselves are built of wooden planks and require no metal lin-

ing. They soon acquire a lining of small pieces of crushed stone and stone dust, over which the larger pieces of stone going to the crushers or screens slide easily. Likewise the bottoms of vertical chutes are protected from blows and wear by deposits of crushed stone and dust.

This plant has been in successful operation for a number of years, so the idea has been thoroughly tested out. James M. Shaw is vice-president in charge of operation.



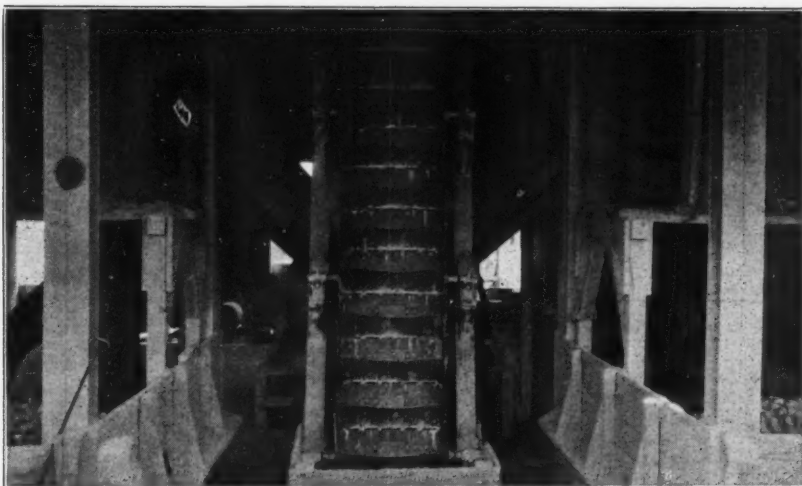
Stone chutes lined with stone



Crushed-stone lined chutes in limestone crushing plant



Bin feeding tube mill



Another view showing wood chutes lined with crushed stone

Marlborough Sand and Gravel Corporation Plant Sold

Rosoff Engineering Company, New York City, Pays \$290,000 for Hudson River Plant

ONE OF THE MOST NOTABLE sand and gravel operations in New York State is that near Marlborough on the west shore of the Hudson River, about 60 miles above New York City. It was built in 1916 by the John B. Rose Co., of New York City. Mr. Rose was a prominent brick manufacturer.

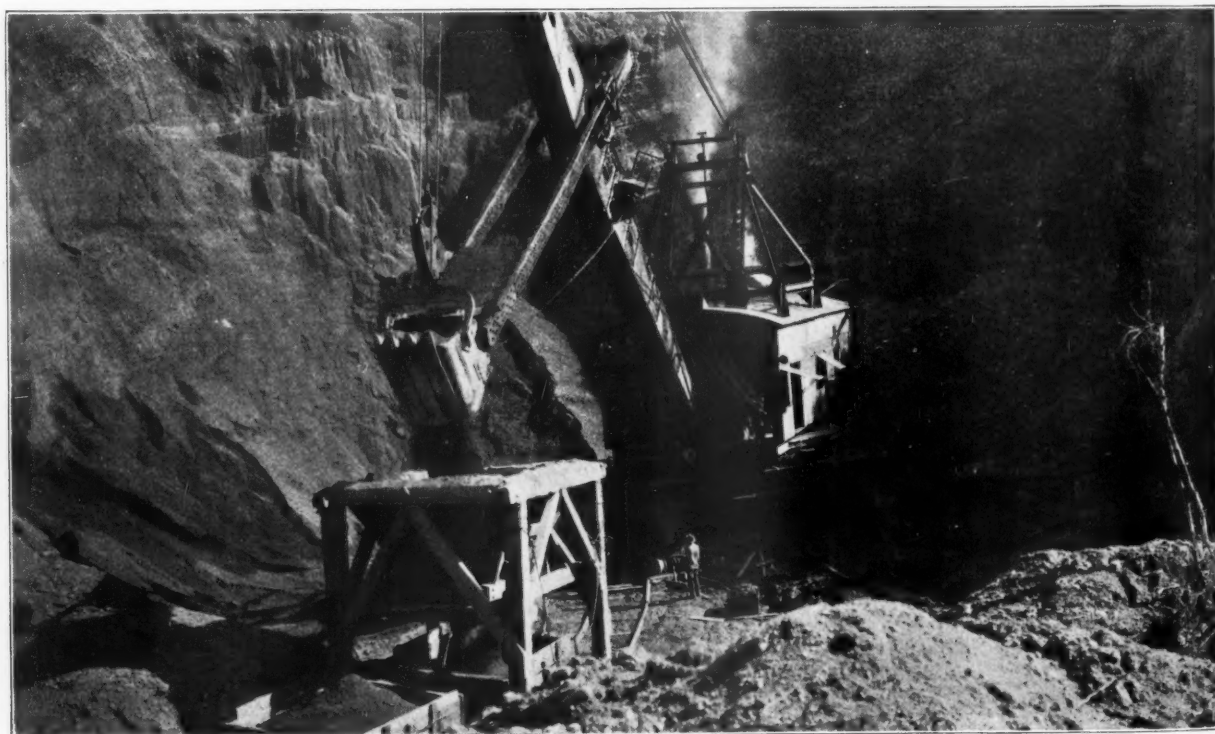
The plant was dedicated on August 30, 1916, with a clam-bake and party, attended by about 200 engineers, contractors and material men as the guests of Mr. Rose. In these dry days this party is a thing of tender memories.

In spite of its auspicious send-off the company soon met with financial troubles. The plant was subsequently taken over by the same parties owning Alsen Cement Works, at Catskill. Both properties have recently been through a receivership in the United States Court and on April 22 both were sold at auction to the Rosoff Engineering Co., Park Row Building, New York City. The price paid for the sand and gravel plant was \$290,000.

The sand and gravel deposit is in a bluff a short distance back from the Hudson River, on the shore of which the plant is located. The pit is excavated with



Entrance to Marlborough sand and gravel pit



Big 3½-yd. shovel, 75-ft. boom, and loading hopper in pit

a 175-lb Bucyrus steam shovel, one of the largest in the sand and gravel industry. The bank is 90 to 100 ft. high and the shovel is equipped with a 75-ft. boom and a $3\frac{1}{2}$ -yd. dipper.

The material is loaded into 7-yd. cars through a pit hopper, as shown in the accompanying illustration. In order to keep the steam locomotives a safe distance from the dipper in its dumping position the first car of the train is connected to the locomotive by a long drawbar, 10 or 12 ft. long. (The locomotive is always at the end of the train nearest the plant.)

The material is largely sand and boulders of considerable size, there being very little real gravel. From the dump-car hopper at the plant the material goes by belt conveyor through a scalping screen in the crusher house. The largest crusher is a No. 7½ gyratory. From the crusher house all the material goes by inclined belt conveyor to the top of the screening and washing plant.

Large Sand Boxes

The only unusual features in this part of the plant are the huge concrete sand-settling tanks, built with their bottoms at ground level. The sand is spouted to these from the scrubbers and screens and additional clean water added, so that the final washing is accomplished here. The waste water and silt are removed from these tanks through a series of valves in the side of the tank, arranged vertically

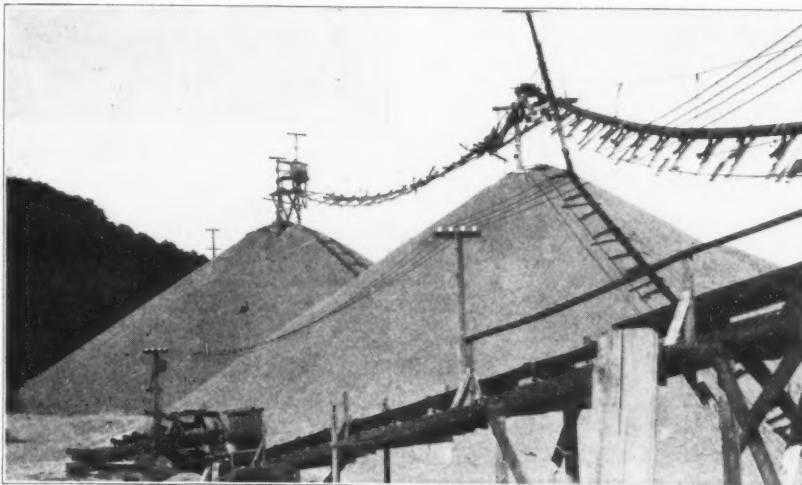
so that as the sand is deposited in the tanks the valves below are closed and the ones above the deposit opened.

The sand-settling tanks are used alternately. As fast as one is filled the flow is directed to another, and the full tank is emptied by means of a clam-shell bucket operated from a large stiff-leg steel derrick. The clam-shell and derrick deposit the sand in ground-storage piles over concrete tunnels. The belt conveyors in the tunnels bring the sand back to a belt conveyor leading to railroad and large loading bridge. For motor-truck

loading the small steam shovel shown in one of the views is used.

Storage for gravel is provided by a belt conveyor operated on a suspension bridge over ground piles, as shown in one of the views. At the time this view was taken this conveyor was out of commission, but the scheme was said to have worked successfully. From this ground storage the gravel is reclaimed by underground tunnels and conveyors.

The conveyor bridge shown in the last view extends over the tracks of the West Shore R. R. to a final washing plant. The



Gravel in ground storage over concrete tunnels



General view of the plant of the Marlborough Sand and Gravel Corporation. Hills in the background are on the opposite side of the Hudson River

correct mixture of sand and gravel is sent over this bridge to be loaded on cars or in river barges, but before being loaded is put through a battery of shaker screens, operating under a shower of clean water, to thoroughly clean the material.

More wash water was being used in this operation than any other the editor has visited, but he was unable to obtain the ratio of water to the sand and gravel turned out. However, there is the whole Hudson River to pump from, and the waste water goes right back into the river, so there are no disposal problems.

George C. Hudson has been superintendent of the plant ever since it was built; in fact, it was originally built under his supervision.

Building Outlook Good in Vancouver, B. C.

"IT IS NOW generally realized that building costs have at last reached a stable basis and that this condition will obtain for at least this season," said James Pennington of Champion & White, Ltd., Vancouver, B. C., in discussing the building outlook. "The experience of our firm, I think, has been the experience of probably most of the building firms in Vancouver, that more inquiries have been received this spring than possibly since 1912.

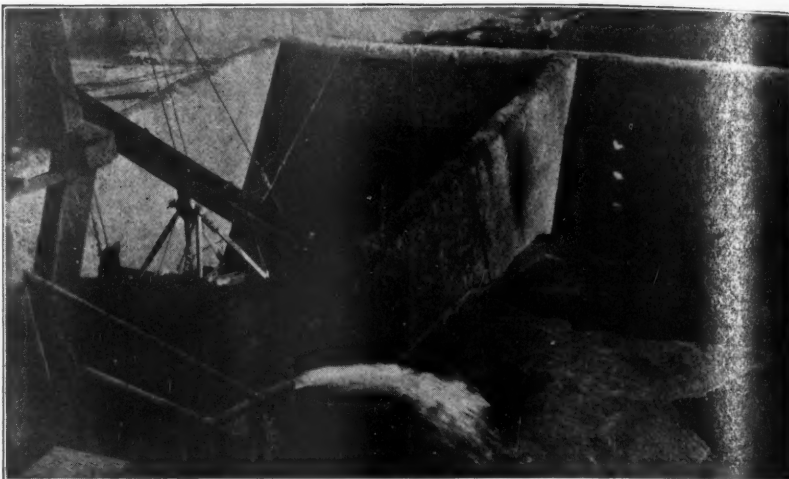
"Many of these inquiries are with regard to buildings of lumber construction, but brick and re-inforced concrete structures will also be erected in many parts of the city this year, I believe, the requests for information and the recent big reductions in the costs of the materials entering into the construction of those buildings, being sufficient proof of this.

"For instance, we have reduced the prices of sand and gravel, the drop being from \$1.00 to \$1.50 a yard. The prices of bricks and other materials have come down in proportion, and when it is realized that the drop in sand and gravel is from 35 to 40 per cent, it can be seen that quite an inducement to the large number who have delayed building, is being offered."

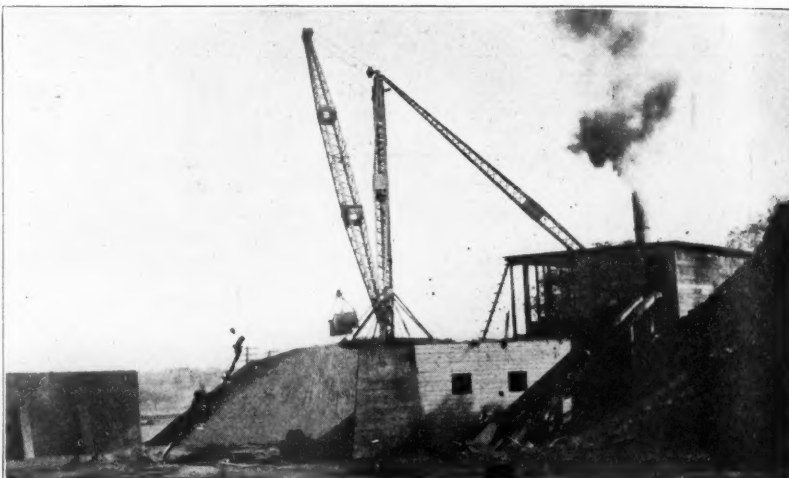
Champion & White, Ltd., has purchased the Fresh Water Sand & Gravel plant at Hillside, about 22 miles from Vancouver, on Howe Sound, and are making preparations to ship large quantities to Vancouver to meet the big demands anticipated this season.

Many Uses for Silica Sand

THE FOLLOWING uses have been found by a California firm for their white, silica beach sand: Glass making, foundry cores and facings, steel casting, sand blasting, marble polishing, roofing, filtration, stucco, plasters, white mortars, playgrounds, sand boxes and plant propagating.



Very large concrete sand-settling boxes



Stiff-leg steel derrick and clam-shell for sand storage



Side of sand-settling tanks (left) showing valves for waste water

Wisconsin Aggregate Producers Win Rate Case

Get Almost the Zone Mileage Scale They Asked for from State Railroad Commission

THE WISCONSIN MINERAL AGGREGATE ASSOCIATION has again proved its metal, justified its existence many times over, and achieved a victory of lasting usefulness to the whole mineral aggregate fraternity. The following decision was rendered by the Wisconsin Railroad Commission on May 4, 1921:

"The Wisconsin Mineral Aggregate Association having informally complained to the Commission of the present rates on sand, gravel and crushed stone in the State of Wisconsin, the Commission on its own motion instituted this investigation for the purpose of fixing just and reasonable rates in the State. The hearing was held at Madison on April 18, 1921, the appearances being Burton H. Atwood and O. C. Hubbard on behalf of the Wisconsin Mineral Aggregate Association (besides a number of witnesses representing individual producing companies).

"To the producers of sand, gravel and crushed stone the cost of transporting their commodity is of unusual importance. The value of the commodities is so low that the transportation charges constitute a very large proportion of the total cost at point of railroad delivery. Sand and gravel pits are numerous over practically the entire state except in the so-called driftless area in the southwestern part. There are also many crushed stone industries. Under these conditions competition between the various producers of these commodities is very keen, so that although the products are as a general thing sold f. o. b. pit or quarry, the transportation charges are the main controlling factor in competition.

"On behalf of the producers it was testified that the greatly increased freight rate was having an adverse effect on the industry; that markets which industries had enjoyed for many years previous to the present level of rates were being lost to the producers and that unless some relief along the line of lower freight rates could be secured the industry itself was threatened with extinction in many instances. The testimony showed that in some instances water competition on crushed stone, sand and gravel has had the effect of curtailing or stopping short shipments by rail of these same products. The producers also claimed that the high

level of freight rates on this material was developing the trucking industry for short hauls and opening up many new local pits throughout the state, resulting in curtailment of the business of established producers and actually discouraging freight transportation of these products. Many of the producers were of the opinion that a somewhat lower scale of rates would encourage the movement from their pits and quarries; that it would tend to encourage building and construction and in the end lead to increased advantageous transportation for the carriers; that in many cases the consumers were using a much lower grade of material from local pits in preference to the higher grade which could be secured from established pits and quarries at more distant points by rail transportation.

"The average haul in Wisconsin of course varies from different pits and quarries, probably being between 40 and 50 miles. It varies in different localities and on different lines and formerly and before the present freight rates the movement was very heavy for short distances, such as 20 and 25 miles. This material moves in open-top equipment and the evidence was quite clear that average loading was 50 tons. The largest movement is from April to December.

Highway Commission Testifies

"On behalf of the Highway Commission it was testified that that Commission had determined not to build any except the very important roads while the present freight rates on this material prevailed, and that highway construction showed a tendency to change from concrete to other materials in order to avoid the heavy freight rates on the aggregates. Wherever possible the Highway Commission is avoiding the movement of this material by rail. It was also felt by the Highway Commission that not only would lower freight rates in themselves give them considerable help in the matter of roadbuilding at this period but if the sand, gravel and stone producers could be assured of a larger use of their output and could produce more nearly to capacity the Highway Commission would be in a position to get a lower price on the product at point of loading.

"The Railroad Commission many years

ago established a distance rate basis on sand, gravel and crushed stone for movement over the principal railroads of the state. It was in effect for many years but was changed twice during and since the war, first by General Order No. 28 and since then by our order following that of the Interstate Commerce Commission in Ex Parte 74.

"The result of the methods of disposing of fractions of a cent was to make the rate steps for different lengths of haul one-half cent, whereas under the former scale the steps were only one mill. The increase of the rate steps has been accompanied by spreading of the distances over which the various steps apply. Under the old Wisconsin schedule the rates changed with every five miles of distances, whereas now each rate step covers a much greater range of mileage to the extent that we have what might be called a group mileage basis; that is, for all distances from 10 to 30 miles, inclusive, the rate is 3½ cents; for all distances from 35 to 55 miles, the rate is 4 cents; for all distances from 60 to 85 miles, inclusive, the rate is 4½ cents and beyond that to 130 miles, 5½ cents.

"Testimony was introduced to show that the average increase in rates for the actual movement which had taken place under the present rates, or by the application of present rates to past movements, is or would be more than 100 per cent over the actual freight charges under the scale of rates formerly in effect in this state. The general increase under Order No. 28 was assumed to be about 25 per cent. Ex Parte 74 was designed to bring about an increase in this territory of 35 per cent above the rates then existing or a total increase over the former schedule of about 68.75 per cent.

"The testimony also established the fact that the earnings per car on account of the heavy loading were considerably in excess of the earnings per car on other material such as pulpwood, logs and hay, while the value of such commodities was of course considerably in excess of the sand, gravel and crushed stone values. The ton mile earnings under present rates are very large, running for some hauls from nearly three to four cents a ton mile to around one cent for even the longer hauls in the state.

Railways' Defense

"On behalf of the carriers it is contended that no reduction or change in these rates is justified as the railroad operating ratio is at present nearly 100 per cent and for some of the recent months exceeds 100 per cent on some of the lines; that the rates in and of themselves are reasonable when compared with rates in other states or in C. F. A. territory and numerous exhibits and comparisons are made between the rates in existence in the State of Wisconsin and rates in Iowa, Nebraska, Illinois, Minnesota, South Dakota and Michigan. In Illinois the distance tariff on gravel seems to correspond closely with the sand, gravel and crushed stone rates in Wisconsin. In Iowa the shorter distance rates appear to be lower and in Minnesota a little higher for most distances.

"The movement in Wisconsin undoubtedly fell off after Ex Parte 74. Just how much of this falling off was due to the increase in rates and how much to the car shortage it is impossible to determine, nor can one say definitely how much industrial conditions may be affecting the present movement of sand, gravel and crushed stone in this state. Nor is it possible to determine how much the present freight rates may in and of themselves be discouraging certain classes of building and construction.

Not Considering Rates Generally

"The question before this Commission is not one which in our opinion makes it necessary to determine all of these factors. Certain specific rates are before us for consideration. Questions relating to the general level of rates throughout the country or in the State of Wisconsin are not now before us. The operating condition of the carriers at present is such as to demand careful consideration of the treatment of any matter before us relating to railroad freight rates. The tonnage movement of sand, gravel and crushed stone in the State of Wisconsin has in the past been very heavy. The carriers are entitled to remunerative rates on different classes of traffic.

"The commodities under consideration are of very low grade and their transportation by the carriers is unquestionably affected to a considerable extent by the freight rates in effect. The increases given on sand, gravel and crushed stone have not been on a strictly percentage basis but on an arbitrary basis with an arbitrary disposition of fractions which has put the present rates out of line with those generally in effect in the state if percentage increase alone is taken under consideration. Loss and damage claims in this sort of traffic are practically nil. The equipment is open-top and the movement is very heavy and at times in the past has in some instances been in train-

load lots, although as a general thing this is not so. It is our opinion that the rates are working inequitably in this state and are tending to discourage the movement of these materials by rail.

New Rates Profitable to Railways

"No evidence was offered by any of the parties before the Commission concerning the cost of rail transportation of the material herein involved. The Commission has, however, following the cost analysis methods outlined in previous decisions, made some studies of the cost of moving these commodities. The schedule of rates hereinafter fixed is not graduated strictly in accordance with the relative terminal and movement costs found from these studies, but the general level of the rates is designed to yield the carriers a fair return on the movement of these commodities as a whole.

"While the distance scale heretofore in effect in this state has been for 200 miles, we have not thought it necessary at this time to promulgate a distance scale for more than 100 miles. It may be found necessary later to make adjustments for the longer distances, but we are of the opinion that it is the shorter distance rates which most clearly demand adjustment at this time. The rates fixed for the longer distances in the 100-mile scale are not very different from the rates which would grow out of the application of the 25 per cent and 35 per cent increases heretofore referred to.

"As the present rule for combination rates on these commodities expires June 1, 1921, we are providing for combination rates where lower joint rates are not now published and in effect.

"We find that the rates hereinafter established are in and of themselves reasonable and remunerative to the carriers and that the present scale of rates for the same distances is not justified.

"It Is Hereby Ordered that the rates for transportation of sand, gravel and crushed stone, and other articles taking the same rates, between points in Wisconsin where the movement is single line and wholly within the State of Wisconsin, shall not exceed the following rates in cents per 100 pounds for the distances herein designated (effective May 14).

NEW ZONE-MILEAGE RATES

Miles	Rate in Cents Per 100 Lbs.	Miles	Rate in Cents Per 100 Lbs.
5.....	2.3	55.....	3.8
10.....	2.5	60.....	4
15.....	2.6	65.....	4.1
20.....	2.8	70.....	4.2
25.....	2.9	75.....	4.3
30.....	3.1	80.....	4.4
35.....	3.2	85.....	4.5
40.....	3.4	90.....	4.6
45.....	3.5	95.....	4.7
50.....	3.7	100.....	4.8

"Except as otherwise provided herein: Rules, regulations or other privileges now in effect applying on carload shipments of commodities named, which in any way increase or decrease the value of the serv-

ice to the shipper will not be affected by this order.

"Combination Rates: Rates named herein on sand and gravel; stone, crushed or broken; carloads, are subject to the following rule for constructing combination rates. When separate rate factors are used in constructing a combination rate over two lines of railroad, deduct one and two-tenths (\$.012) cents per 100 pounds from the total of the two single rate factors to establish the combination or joint rate.

"Where commodity rates are now published and in effect applying on sand, gravel and crushed stone via lines of respondent carriers either on local or joint traffic that are lower than the rates as herein named, such rates will not be canceled or affected by this order."

Scale Asked For

The scale of rates which the witnesses for the Wisconsin Mineral Aggregate Association asked for were as follows:

Miles	Proposed New Scale	Miles	Proposed New Scale
5.....	2.2	55.....	3.2
10.....	2.3	60.....	3.3
15.....	2.4	65.....	3.4
20.....	2.5	70.....	3.47
25.....	2.6	75.....	3.54
30.....	2.7	80.....	3.61
35.....	2.8	85.....	3.68
40.....	2.9	90.....	3.75
45.....	3	95.....	3.82
50.....	3.1	100.....	3.9

Combination Rates Suspended

THE RAILWAYS of Wisconsin have accepted the State Railroad Commission's order for lower rates on sand, gravel and crushed stone, with the exception of the combination rates. These have been suspended pending another hearing before the commission on May 31.

Interstate Commerce Commission Gives Sand Producers Its Sympathy

AT ITS APRIL MEETING, the American Sand Association (an organization of silica sand producers) adopted and the secretary was instructed to forward to the chairman of the Interstate Commerce Commission the following resolution:

The American Sand Association, cognizant of the industrial depression which has seriously affected the prosperity of the country and believing that the present transportation rates are a contributing factor thereto, respectfully urges that the Interstate Commerce Commission investigate the situation with a view to such a reduction and readjustment of rates as will produce a fair return to the carriers and at the same time stimulate the business of the nation.

To this the secretary has received a reply from the secretary of the Interstate Commerce Commission which offers an interesting analysis of the situation. The letter from the Commission is as follows:

This will acknowledge the receipt of your letter of the 14th instant in which is quoted a

resolution by the American Sand Association, adopted at its April meeting held in Cleveland, Ohio, on April 13.

The commission is as anxious as the shipper and the carrier to find a solution of the transportation problem. We are well aware and I think fully advised of the unfortunate conditions that exist at the present time. We can not, however, look at the situation from one side alone. It is not a question today whether or not the rates shall produce five and one-half or six percent upon the value of the carriers' properties. The unfavorable conditions in commerce and industry generally and the unfortunate plight of individuals or individual industries can not be worse than the present plight of the railroads. More than one-half of the carriers are earning less than their operating expenses and taxes. A very few individual roads are earning their interest charges. Some of them are not even earning their operating expenses. It is obvious that the present condition cannot long continue without general and widespread bankruptcy of the railroads.

We have participated in some instances in arranging and encouraging readjustments of rates where it has been made clear that such readjustments would move a substantial volume of traffic at rates that would yield some profit, which traffic would not otherwise move at all, but in view of the facts above stated, it is difficult to see how the Commission could urge any reductions in rates that would result in reductions in revenues of the carriers which are insufficient now to pay the interest on their bonds, to say nothing of any return to the stockholders.

We have investigated many instances of hardship in which it has developed to our satisfaction that it is not the freight rate that is preventing the movement but the economic and market conditions. The whole country is suffering the inevitable after effects of the war, many of which are controlled by economic forces of world-wide effect and can not be overcome or readjusted suddenly or rapidly. The difficulties which the railroads and business generally are suffering in our country are the same as in all other civilized countries and in the most of them in a more marked degree than in the United States.

This whole subject is receiving the most careful study and consideration. The bare operating expenses of the railroads consume more than ninety cents out of every dollar earned and more than sixty cents out of every dollar earned is paid out in compensation to the employees. It is obvious that until a wider margin can be established between the dollar earned and the cost of earning it conditions can not substantially improve. This result must be brought about through appropriate readjustment of operating expenses, the adoption of every possible and reasonable economy and gradual revival in business. We are not hopeless nor pessimistic as to the future.

It is believed that the resolution that has just been adopted by the Senate for the conduct of an investigation into the question of why the railroads have not prospered under the Transportation Act will bring out all of the facts with regard to the operating expenses and the high operating ratios and also any serious defects in management will doubtless be disclosed.

Nebraska Rate Hearing on Aggregates

A CONFERENCE between producers of sand, gravel and crushed stone and the Nebraska Railroad Commission was held in Lincoln, Neb., May 9. Rate schedules were discussed but no definite action was taken pending the outcome of the national conference between producers and railway executives, now scheduled to take place in Washington, D. C., June 2.

Sandles Tells of White House Conference on Rates

Secretary of the National Crushed Stone Association Gives Details of How Meeting With Railway Executives Was Arranged

A. P. SANDLES, secretary of the National Crushed Stone Association, has issued the following statement in regard to the conference with President Harding on freight rates, mentioned in ROCK PRODUCTS, May 7, 1921, page 49. The meeting between producers and the railway executives was to have taken place Friday May 13, but was subsequently postponed to Thursday, June 2. Mr. Sandles' bulletin to the Association members, dated May 7, reads:

"Agreeable to the President of the United States, a conference between railway executives and shippers of low-grade freight will be held at Washington, D. C., Friday, May 13, 1921.

"Daniel Willard, president of the Baltimore & Ohio R. R. and chairman of the Association of railway executives, says: 'Can no doubt arrange conference May 13, with understanding that both sides in interest are prepared to discuss matter in its broadest aspect with spirit of co-operation. Doubt if much good would be accomplished if the discussions are confined merely to the matter of railway rates.' In a previous statement, Mr. Willard says, 'If such conference is held it must be with the biggest men in the several industries represented and not with traffic men, jobbers, brokers, etc.'

"This office received the following letter from Daniel Willard under date of May 3, in reply to a letter from this office on May 1:

Your letter of May 1st has just reached me in Chicago, and I note what you say therein with reference to conference to be held in Washington between representatives of the railroads and building material producers.

I expect to be in Washington Friday of this week and will be glad to talk with you further about the matter at that time. I cannot say definitely now just when a conference can be held, because I find some conflicting opinions as to who ought to attend such a conference on behalf of the material producers. I am personally willing to attend a meeting such as I discussed with Mr. Sutton, provided those who represent the shippers are willing to consider the question of price reductions as well as freight rate reductions. I am not convinced that the mere reduction of freight rates would go very far of itself at this time to stimulate business activity. Please understand that I have no authority to speak for the railroads generally in this matter, but I am willing to use whatever influence I may have along the lines of my discussion with Mr. Sutton, provided the shippers are willing also to take the matter up in a broad and helpful way.

"President Harding feels that some good may result by shippers and carriers thus getting together. Whatever is done must be upon the basis of *good* for all concerned and not to help some and punish others. Mr. Harding was quite positive in his message to Congress that freight rates are too high and must come down. He also insists that the cost of operating the railroads must be reduced.

"There is tremendous pressure at Washington for rate reduction, especially on low-grade freight. The Interstate Commerce Commission is not inclined to grant relief to shippers unless railways volunteer to give relief. Only a few state commissions have taken action to lower rates on shipments wholly within the state. This action by states has in some instances wrought injury to producers who enjoy inter-state patronage. Therefore, relief from excessive rates must apparently come through conference with railway executives, as Mr. Harding sees the situation and as Mr. Willard has graciously recognized.

"At a conference at the White House, Friday, April 29, 1921, President Harding told your secretary and other representatives that under the law he was powerless to do anything other than recommend conference and wise consideration of mutual interests of shipper and carrier.

"Daniel Willard and associates are the biggest and keenest men in the country. They are well informed and only sound, economic argument will appeal to them. They see the whole game, which is big. We may unconsciously confine our vision to our own industry or even to our own plant. On this broader basis we can present and win our appeal for lower rates. We will have the moral support of president, press and congress. On this basis, brick, gravel, sand, slag, stone and lumber can agree. We will be united. There will be no divided house on mileage basis, etc.

"We had headache while others had joy rides during war. Many industries were called upon for abnormal production. We had sub-normal. Our prices and profits did not soar. Added freight rates were all the traffic would bear and shot rates higher than plant price. The increase on short haul was extreme and hit the whole industry."

Rail Wages to Be Reduced

ANNOUNCEMENT was made May 17 by the Railway Labor Board that it would reduce all railway employees' wages on July 1, the exact amount of the reduction to be made public on June 1. This gives significance to the many postponements of the conference between the railway executives and producers of building materials. Evidently rate reductions will be in line with wage reductions published June 1.

Freight Rate Scale Proposed by Producers of C. F. A. Territory

Sand and Gravel Men of Ohio, Indiana, Michigan and Illinois Ready When Railway Men Ask for Suggestions

REPRESENTATIVE SAND AND GRAVEL PRODUCERS in the Central Freight Association territory have been dickering for some time past with the members of the Central Freight Traffic Committee for a downward revision of rates on these commodities.

Realizing that their case was difficult to argue unless they were ready to present something constructive, Indiana producers took the initiative and developed a rate structure which has met with the general approval of producers in that state. This rate structure was designed by the rate committee of the Indiana Association, consisting of Messrs. H. E. Neal, H. L. McGurk, and G. V. Miller, and is as follows:

RATE STRUCTURE (Per Ton)			
Miles	Rates	Miles	Rates
0-10	.40	101-125	.80
11-20	.45	126-150	.85
21-30	.50	151-175	.90
31-40	.55	176-200	.95
41-50	.60	201-225	1.00
51-60	.65	226-250	1.05
61-75	.70	251-275	1.10
76-100	.75	276-300	1.15

A 10 cent differential should be added to the above rates for multiple line hauls. The above scale to apply in C. F. A. territory outside of the Chicago zone district.

This structure will hereafter be known as the "C. F. A. Scale." This title was agreed upon at a meeting of producers from Indiana, Illinois, Ohio and Michigan, Wednesday morning, May 11th.

The Indiana Association "News Letter" of May 14 contains the following account of the meeting with the railway men:

"The hearing before the Central Freight Association Traffic Committee in Chicago was held at 2:30 p. m., Wednesday, May 11th, with the following in attendance: F. D. Coppock and Guy C. Baker, representing the Ohio producers; Leet Denton, president of the Michigan Sand & Gravel Producers' Association; W. G. VanEtten, of the H. D. Conkey Co., Mendota, Ill.; the following from Indiana: M. A. Neville, H. E. Neal, G. V. Miller, W. P. Carmichael, and R. C. Yeoman; Chairman Morris, and one other member of the C. F. A. Traffic Committee, and about 25 railway men.

"Mr. Coppock, as spokesman for the gravel producers, referred to the February 24th meeting, indicating that the data presented then would apply at this time, and that the operating season had advanced far enough so that much addi-

tional evidence could be presented. He gave a number of striking instances of loss of business due to the installation of local plants, which were made possible under cover of high freight rates. He argued that if it was good business at one time for the railways to solicit the business of the gravel producers and make rates that would move their materials, it was still good business to do so. He stated emphatically that if the railroads would do their part in reducing freight rates, his company would do theirs in reducing the price at the plant, showing that by co-operating in this way a large part of the business lost this year would be restored and normal business be insured for the future. He asked for the immediate removal of the 40 per cent increase, and that a study be started toward building up a permanent rate structure.

"R. C. Yeoman then presented evidence collected from the Indiana State Highway Commission and county surveyors, estimating the loss of business for this year in Indiana due to high freight rates. A signed statement from Mr. Wright, former director of the State Highway Commission, was submitted showing that if prices of delivered materials became satisfactory and contracts could be let in June, 1,137,900 tons might yet be used this year. The Maintenance Department of the Commission indicated that nearly half a million tons would be lost to shipping plants due to high freight rates and that they were constantly exploring local deposits to find ways of securing the material without paying the high railway transportation charge. The county surveyors' questionnaire was answered by 37 counties and gave an estimate of 1,800,000 tons of washed and screened gravel that was lost to Indiana producers due to high freight rates for the year.

"Messrs. Neville, Neal, Miller and Carmichael added further information regarding business lost at their respective plants due to new local competition.

"Messrs. Denton, Van Etten and Baker added similar information to the above, covering their respective territories.

"The carriers' representatives combated all suggestions for a general rate reduction, claiming that the removal of the 40 per cent would make some rates too low. They agreed that a new rate structure was necessary, but not substantially lower than the present level, except in particular instances. They brought out

the fact that gravel producers are able to employ cheap labor, but that they cannot. It was apparent that the unsettled condition of the labor question influenced their attitude.

"Upon request from the carriers for suggestions for a level of rates that would move materials, President Neville submitted the scale of rates prepared by the Indiana rate committee, and which had been approved by the producers in Indiana, Ohio, Michigan and Southern Illinois.

"The C. T. A. Traffic Committee took the information and the scale under advisement and promised to report their findings in a few days. They were asked to give an answer before the hearing of the National representatives of the building trades before the Association of Railway Executives, which will be held in Washington on June 2."

Newspaper Comment on New England Railways' Rate Reductions

CRUSHED stone, sand, gravel and slag do not often offer the theme for daily newspaper editorials, yet we find the following quite pertinent one from the Dorchester (Mass.), "Telegram":

"It is an axiom of political economy that a consumer will not pay more than he has to for an article, and that as the price advances he looks about for a substitute, and finding it, the seller of the original, whether it be commodity or transportation, is left to peddle it elsewhere. Just now there is example of this habit in news that the New Haven railroad is to make voluntary reduction in freight charges on road building material—because the users of that material have found means, because of those high freight charges, to provide substitutes.

"Many communities contemplating extensive road improvements were content to use sand, gravel and crushed stone from central plants—as long as the freight charges were what they considered reasonable. The freight rates rose, and rose, and rose. The communities began to look about them. They found sand, gravel and stone near by. It wasn't perhaps as good a quality as that shipped by freight, but its use took freight charges off the bill at once. Therefore they began to build stone crushers and prepare their own material. The "necessity" of using the foreign material and paying the freight was done away with, and the substitute found.

"That, of course, meant less business for the railroads, which meant less income. Therefore the railroad communed with itself and decided that business with some income was better than no business at all, hence report that voluntary reduc-

tions are to be made averaging 20 cents a ton in the freight rate on stone, gravel and sand. The entire incident illustrates exactly the theory learned by students of political economy, that the heavier the impost placed upon the use of an article, whether for its purchase or its transpor-

tation, the more active the search for a substitute. "Charging all the traffic will bear" used to be a cardinal principle of railroading. In the present instance it appears that the charge was not "all" but more than the traffic would bear—with consequent loss of the traffic."

President of the Illinois Central on Mileage Scales

Says Uniform Mileage Scale of Rates on Mineral Aggregates Is Not Practicable

PRESIDENT C. H. MARKHAM of the Illinois Central R. R. has been running a series of advertisements in the Chicago newspapers to the effect that freight rates *could not* be reduced under present circumstances. The advertisements ended with an invitation to submit suggestions. The editor took the liberty of calling Mr. Markham's attention to the plight of the mineral aggregate industry and enclosed with the letter a copy of the article by E. Brooker, "A Plea for a Uniform, Consistent Scale of Freight Rates," from the March 12 issue of *Rock Products*.

Mr. Markham has replied to this letter, in part as follows:

"There are many angles to construction of rates and it is one of the things upon which there is no possibility of everybody agreeing. Mr. Brooker's article is very interesting, but there are many that would disagree with him.

"I do not wish to enter upon any controversy, but it seems to me the establishment and maintenance without departure of a mileage scale of rates on crushed stone, sand and gravel is not entirely practicable, all elements affecting rate making considered.

"All of the conditions of production, distribution and transportation are not the same, say in the states of Ohio, Michigan, Wisconsin, Illinois and Iowa, nor are they the same on all of the roads in any one of these states even to such an extent as would result in a mileage scale strictly adhered to satisfying all of the commercial interests.

"A mileage scale would make a simple tariff, but it would in a way create a monopoly for the short haul quarry or pit and it is entirely possible that such an industry might be located at a point where it would be shut out of large business profitable alike to the shipper and carrier; in other words, a mileage scale would eliminate competition to the extent that the freight rates entered, and we are told that the freight rates are the controlling factors in the distribution of these products.

"Therefore, I cannot say that in my opinion a mileage scale could be so adjusted as to properly take care of the needs of these industries throughout any general territory such as apparently is in mind.

"C. H. MARKHAM."

Freight Conference Postponed

NO CONFERENCE between building and material men and the railroads took place in Washington, May 13, as announced, because of a misunderstanding that arose as to the scope of the conference, according to the Washington Bureau of the "Traffic World." The "Traffic World" states further:

"Daniel Willard contended that when he said he had no doubt a conference could be arranged he had in mind only road building material. Railroad men would not hear to suggestions for a conference covering all building materials. Negotiations were still on when this was written with a view to bringing about some kind of meeting.

"Announcement by the road-making and building material associations, through their Washington representatives, that there would be a conference, May 13, of carriers and shippers with a view to bringing about a reduction of rates, seems to have been not only premature, but inaccurate. Daniel Willard, in his telegram to E. Guy Sutton, representing the Sand and Gravel Producers' Association, said he had no doubt a conference could be arranged for May 13. Mr. Willard, in this telegram, referred to the conference as one of "building material" interests. Later it appeared that he had in mind only road-building materials.

"When the evidence of that lack of understanding by some of those who were expected to go into conference became known, doubt as to whether there would be any kind of conference May 13 became almost a certainty that there would not. The sand and gravel men were not unwilling to go into conference on the sub-

ject, but they had been acting with lumber and brick associations in that matter, so they were not disposed to go forward with such a restricted conference, especially inasmuch as sand and gravel used in building construction is a large share of the business of sand and gravel producers.

"At a meeting of the Washington representatives of the building material interests, held in the offices of the American Mining Congress, May 9, it was decided that E. Guy Sutton, executive secretary of the Sand and Gravel Producers' Association, and Frank Carnahan, representing the National Lumber Manufacturers' Association, should call on Mr. Willard with a view to clearing away any misunderstanding as to the scope of the conference. Mr. Sutton had initiated the move for such a gathering, in the latter part of April, after consultation with Mr. Carnahan, and had obtained, he thought, an agreement with Mr. Willard providing for such a conference as the latter had indicated he thought could be arranged for May 13. In their meeting of May 9 the Washington representatives went over the correspondence and, as they read it, there was no doubt about Mr. Willard having mentioned building materials as being the commodities to be discussed, and not merely road-making materials.

"Before taking up the subject of rate reductions with Mr. Willard, representatives of the building material interests had consulted traffic managers, rated as high as vice-presidents, but had been met with the assertion that the problem was national in scope and that, therefore the particular traffic manager with whom the talk was taking place could do nothing.

"On the theory that it was a national problem the Washington representatives took up the subject with Mr. Willard as the chairman of the committee of executives which had conducted rate increase cases before the commission. The face-brick people, in particular, had found it impossible to make any progress in talking with traffic managers because, the latter asserted, it was a national problem with which no particular traffic manager could deal.

"At the meeting on May 9 the men who thought they had arranged a conference for May 13 could not see how Mr. Willard could have obtained the understanding that the requested conference was to be confined to road-building materials. Therefore they were anxious to have a talk with Mr. Willard for a clearing away of the misunderstanding, and the arranging for such a conference as they thought Mr. Willard had expressed the belief could be arranged for on May 13."

According to recent advices the conference will be held in Washington, D. C., on Thursday, June 2.—Editor.

Practical Chemistry for Lime and Cement Manufacturers

Metals of the Alkalies—Potash in the Cement Industry—Salts of Potassium and Sodium

THE metals of the alkalies are a group of metals which obtains its family name from the fact that the two chief members of it, sodium and potassium, are found in the alkalies soda and potash respectively. The other metals of the group are lithium which is known chiefly from its use in medicine and the rare metals rubidium and caesium.

The metals sodium and potassium are very soft white metals which tarnish almost instantly when exposed to the air. These metals are exceedingly active chemically and decompose water violently when brought in contact with it liberating hydrogen. In the case of potassium the metal actually takes fire when thrown on water and, as it is lighter than water, floats and burns with a violent flame. The hydroxides of the metals so formed are among the most powerful bases. Potassium and sodium are both prepared by decomposing the hydroxide with an electric current. The metals themselves are not used to any extent in the arts although both could be produced cheaply enough if desired. The salts of these elements, however, are among our most important chemical compounds.

The elements potassium and sodium occur quite freely in nature, and enter into the composition of most of the silicate rocks, notably the feldspars and micas. Sea water contains about 3.72 per cent of the salts of sodium and potassium, chiefly the chlorides. Potassium chloride occurs in the deposits of Stassfurt, Germany, and most of the potassium salts come from this source. The source of the sodium compounds (except borax) is sodium chloride or salt. Some salt is obtained from sea water but the chief sources are from extensive salt deposits which occur in this country and elsewhere. Most of our native salt comes from around Syracuse, N. Y.; Manistee and Wyandotte, Mich.; Salina, Kans.; Saltville, Va., Louisiana and West Virginia.

Potash in the Cement Industry

The oxides of potassium and sodium are known as *potash*, K_2O , and *soda*, Na_2O , respectively. Potash and soda occur in clay where they are derived from the weathering of feldspar and other minerals. Clay is one of the raw materials from which Portland cement is made. When cement is burned some of

By Richard K. Meade, M. S.
Consulting Chemical and Industrial
Eng'neer, 11-13 Fayette Street,
Baltimore, Md.

the alkalies are volatilized and pass out of the kiln with the combustion gases, while some remain in the cement. In the case of the potash the amount volatilized is about 50 per cent, and in the case of soda 25 per cent of that present in the raw mix. By proper means, such as the Cottrell electrical precipitators or water sprays, the alkalies can be recovered from the kiln gases. During the war, when potash could not be obtained from Germany, some cement mills did this successfully and one or two continue now to do so.

Limestone does not contain any appreciable quantity of the alkalies and so there is none volatilized from lime kilns.

Salts of Potassium

The principal salts of potassium are the hydroxide, KOH; carbonate K_2CO_3 ; chloride, KCl, sulphate, K_2SO_4 ; nitrate, KNO_3 ; bromide, KBr; iodide, KI, and and chlorate, $KClO_3$. The cyanide KCN and bichromate $K_2Cr_2O_7$ were at one time extensively used but are now replaced by the cheaper sodium salts (see below). By far the largest use of potassium salts is in the manufacture of mixed fertilizers. The chloride (commonly called *muriate*) and sulphate are the salts used chiefly for this purpose.

The hydroxide or potash lye, is used chiefly in making soft soaps, the carbonate for glass, the nitrate (commonly called *salt petre*) in gun powder, the iodide and bromide in medicine and the chlorate in matches, fireworks and medicine.

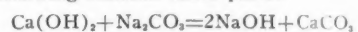
Salts of Sodium

The principal salts of sodium are: hydroxide, NaOH; carbonate, Na_2CO_3 ; bicarbonate, $NaHCO_3$; chloride, NaCl; sulphate, Na_2SO_4 ; nitrate, $NaNO_3$; silicate, Na_2SiO_3 ; cyanide, NaCN, and bichromate, $Na_2Cr_2O_7$.

Sodium hydroxide or *lye* is used for making soap, paper pulp, mercerizing cotton and in the manufacture of many

chemicals. Lime is used in the first three industries in order to manufacture the sodium hydroxide, as explained below. Lime for this purpose should be high in calcium, well burned and low in magnesia, silica, iron oxide and alumina.

Sodium carbonate is made from salt, limestone being used in the process to the extent of 60% of the sodium carbonate produced, and is used in making sodium hydroxide. In doing this the sodium carbonate is dissolved in water in an iron tank provided with stirrers and quick lime is added to the solution when the following reaction takes place:



The calcium carbonate is allowed to settle and the solution of sodium hydroxide drawn off. Sodium carbonate is also used in washing, in softening water, in making glass and sodium silicate. If added to cement it will quicken the set of this. *Soda ash* is commercial sodium carbonate. Sodium bicarbonate is used in baking and in baking powders and is commonly called *baking soda*.

Sodium chloride is *common salt* and is the source of all other sodium compounds and of chlorine and its compounds, including hydrochloric acid. Sodium nitrate or *Chile salt petre* is used in the manufacture of nitric acid and potassium nitrate and, owing to its nitrogen, as a fertilizer. Sodium sulphate, or *glauber's salt* is used chiefly in glass manufacture. Sodium silicate is seen chiefly in the form of a concentrated solution known as *water glass*, which is used as a coating for concrete and for fireproofing wood and fabrics. Sodium cyanide is used for extracting gold from its ores and the bichromate in tanning, in the manufacture of paints, etc.

(To be continued)

Lime on the Lawn

THE NATIONAL LIME ASSOCIATION has just issued an interesting folder by Elmer O. Fippin, general manager, on the use of lime for improving lawn grass. This is one household use for lime, the growth of which is pretty likely to depend on the ease with which lime can be obtained in 10, 12 or 15-lb. packages. The bulletin referred to is No. 118, National Lime Association, Washington, D. C.

Erecting Cement Plant Equipment in India

American Steam Shovels, Cranes, Concrete Mixers, Etc., Are Economical Even in the Country of the Cheapest Labor

I HAVE RECENTLY returned from the Far East, where I spent some months in the jungles of India, supervising the erection of American steam shovels, cranes, concrete mixers, etc., to be used in connection with a large cement plant now under construction there. This cement plant will be the largest of its kind in the Orient, when completed. I thought it would be interesting, perhaps to the readers of *Rock Products* to learn of the methods now used for getting crushed stone for railroad ballast, concrete, etc., in that part of the world. I was located at Jukehi, Central Provinces, a distance of 731 miles from Calcutta, and about the same distance from Bombay. Jukehi is located on the main line of the East Indian Railway, which is the most important railroad in the East.

From Jukehi, they were grading for a branch line extension to Kymore, a distance of 14 miles. The railroad company had about a thousand natives or coolies doing this work by hand. Both men and women in India work on nearly all construction together. The men as a rule do the least work. They fill baskets of dirt and lift them upon the women's heads and the women in turn carry them in this manner to wherever the fill is being made, sometimes from a quarter to half mile. Their daily wage would be about 10 to 15 cents each in our money.

The same with crushed stone for ballast and concrete work. Men break the large pieces of brown sandstones into smaller pieces, the size they can handle conveniently. And then these stones are carried to the railway site, and the women with small hammers again break them into three different sizes as near as they can, and then the stones are sorted and placed in different heaps or piles, whereby they are measured by railway officials, and the natives are paid for their labor on the basis of these measurements.

By this plan the railway gets its ballast crushed and delivered to the building site for practically a very small sum. But of course many times they are unable to get material fast enough. I personally believe if some American concern would go over there and install and demonstrate a modern rock-crushing plant, run by an oil engine (as water for steam plants during dry season or winter months would

By Chester A. Stewart
Acra, Greene County, N. Y.



Chester A. Stewart

be difficult to get in some localities), that modern methods would soon come into use, and this demonstration plant would be the means of securing a splendid foreign market.

Another thing I noticed particularly, was the paving in the streets of Bombay and Calcutta. They of course have asphalt streets in both cities, but they don't seem to understand the business, as the

paving does not last or retain its shape; they either don't get a proper mixture of material or it is a poor asphalt. If some American paving concern would once get a start there, I think that also would prove a fine business proposition. It need not stop at India, but anywhere in the Orient conditions are about the same.

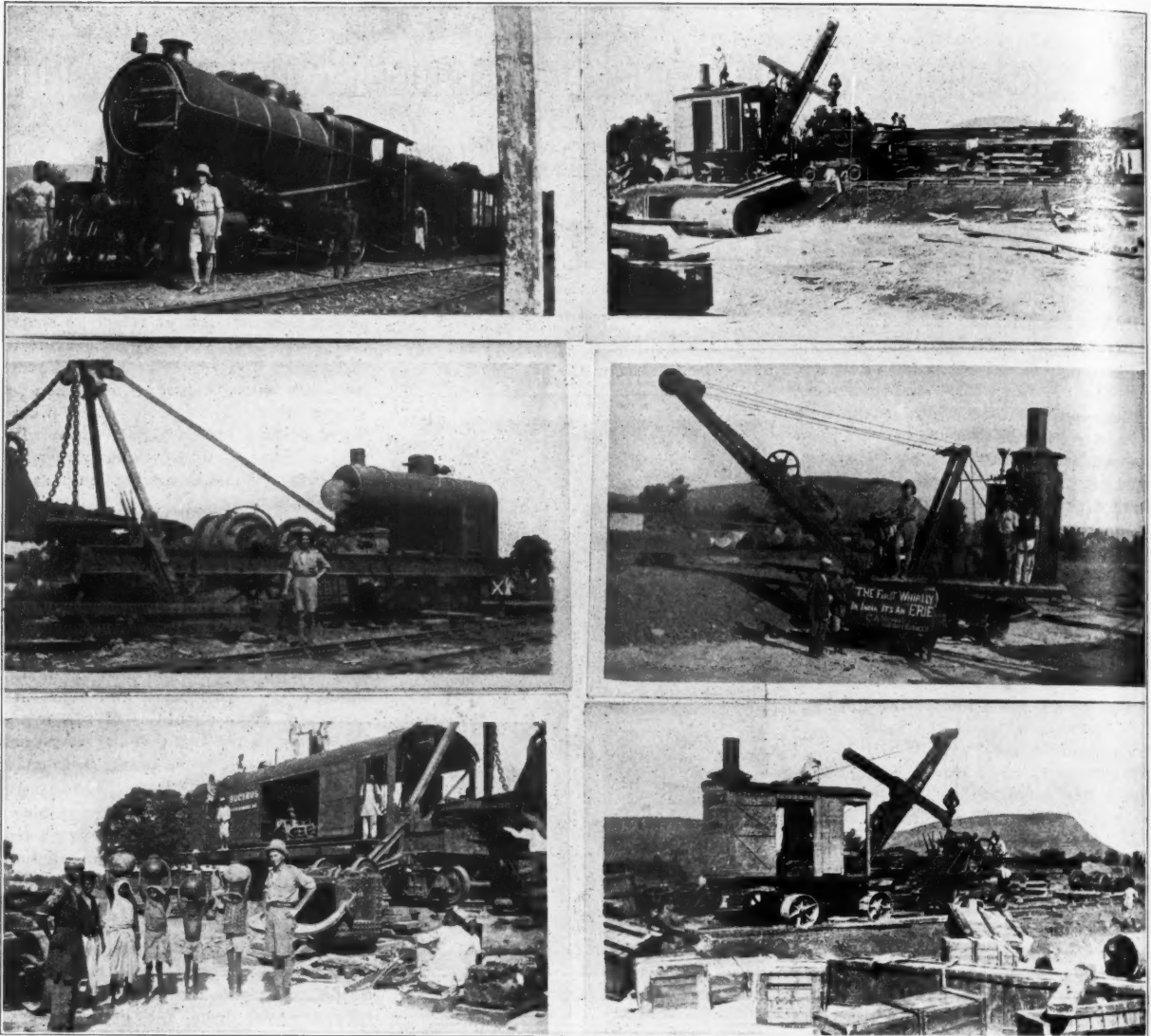
Sand and Gravel Industry of Holland

HOLLAND has an abundance of sand and gravel on account of the great number of ancient river-beds found in the provinces of Gelderland and Limburg, but also the rivers Maas and Waal are sources of large quantities of this material, owing to the fact that the river-sand has proved itself to be of superior quality for building purposes.

A great number of dredging machines are, during the Summer season, stationed on the rivers for the purpose of bringing the sand to the surface; the owners paying an annual rent to the Dutch Government for the privilege of dredging. Whenever a Dutch contractor is in need of sand and gravel for the erection of buildings, he will charter ships to fetch such material from the dredging machines, and after the skipper has moored his boat alongside one of the machines, this will in a couple of hours load his boat with the desired quantity. The capacity of the machines vary from 500 to 3,000 tons a day, and the rent for the privilege of dredging is graded according to the capacity of the machine. In normal years the price for sand is 10 cents a ton, and for gravel 50 cents a ton, but on account of the War these prices have now advanced 50 per cent.

During the Winter season (from December to March) the dredging machines are withdrawn from the rivers and consequently people in need of sand and gravel during that period must either dredge for it themselves or be supplied from the sand and gravel pits in Gelderland and Limburg. However, the material from these pits is not very much inferior to the material taken from the rivers.—A. C. Nelson, American Vice Consul The Hague.

The Author
MR. STEWART has operated steam shovels, locomotives, cranes, derricks, concrete mixers and all kinds of equipment used in the rock products and construction industries. He has been through the whole mill from laborer to superintendent. Only recently he has returned from the Orient, where he had charge of machinery installations.



Erecting American machinery for a portland cement plant in India

Montana Knocks Off 1920 Increase in Freight Rates

IN LINE WITH THE RECENT DECISIONS of the Michigan, New York and Wisconsin State commissions, reducing the intrastate rates on crushed stone, gravel and sand, the Montana commission, April 28, issued a similar order. In the Montana case, however, the order differs in that the reduction, which brings the rates back to their level of August 31, 1920, before the 25 per cent increase granted to Mountain Pacific territory under Ex Parte 74 became effective, includes, in addition to the commodities mentioned, cement. The order is temporary in its effect, the rates called for going into effect May 20, and "continuing in force and effect to and including

the 20th day of November, 1921, when the same shall expire without further action."

The cement rate is specifically ordered back to its pre-Ex Parte 74 level, but the temporary sand, crushed rock and gravel rate is built on a mileage basis, which allows 20 cents per ton additional for two-line hauls over one-line hauls for the same distance. The general level is, however, about what it was on August 31, 1920.

In making the order, the Montana commission calls attention to the fact that it reserved the right to review individual rates when it promulgated its order allowing the 25 per cent horizontal increase. It expresses the hope that the reduction in the rates on road building materials will aid the state which "from an industrial and commercial standpoint

is almost stagnant." It also accepts it as a fact that none of these commodities will move under the present rates and that the volume which will move under the reduced rates will be a benefit to the carriers.

The order of the commission is to the effect that the carriers operating in Montana shall file a new schedule of tariffs on May 20. The rate which is for carload lots and is in cents per 100 pounds is as follows:

Distances	1 Line	2 Lines
Not over 20 miles.....	2½	3½
20 to 30 miles.....	3	4
30 to 40 miles.....	3½	4½
40 to 50 miles.....	4	5
50 to 60 miles.....	4½	5½
60 to 70 miles.....	5	6
70 to 85 miles.....	5½	6½
85 to 100 miles.....	6	7
100 to 115 miles.....	6½	7½
115 to 130 miles.....	7	8
130 to 150 miles.....	7½	8½

Manufacture of Sand-Lime Brick*

Importance of Accurate Compounding of Ingredients

OWING TO THE COMPARATIVELY small number of concerns engaged in the manufacture of sand-lime brick, this industry is perhaps less known and less appreciated than other industries whose importance in the general industrial structure of this country and Canada is of less direct import and bearing than your particular line. Due to this fact, the product which is manufactured and placed on the market is not sufficiently understood in regard to the problems encountered in the manufacture, the overcoming of many difficulties by the manufacturers of sand-lime brick and the excellency of these brick.

Localizing the Brick Business

A large manufacturer of brick, in fact the largest manufacturer of a certain class of shale brick, recently stated to the writer that the brick business at the present time was undergoing some radical changes and that while a reduction in freight rates could be looked forward to, it would be unreasonable to expect rates on brick and other building materials of a heavy and bulky nature to be reduced to a point anywhere in comparison with the rates existing prior to 1916. This gentleman further stated that this would have a great tendency to localize the brick industry and that he could see almost over night, as it were, this situation being hastened by reason of existing economic conditions.

Reducing his remarks to the concrete, the brick industry is at present facing a situation wherein it will be a matter of great economic loss to attempt to transfer shale and clay brick to the points heretofore served by large and localized operations. This, it appears to the writer, would permit of great expansion of the sand-lime brick industry, which should be undertaken by those already engaged in this line of work and who by reason of their experience are enabled better to do this.

A Chemical Process

The manufacture of sand-lime brick is essentially a chemical proposition and to attempt to follow in detail the chemical peculiarities and reactions as they exist in this line from sand bank and lime kilns to the hardening and digesting cylinders would involve an endless amount of detail and tabulation. In fact, were all of these reactions to be followed out a laboratory the size of the large plant, which

*Delivered to the Sand Lime Brick Association at Dayton, Ohio, on Tuesday, April 26, 1921.

By Waller Crow

Secretary, Shaffer Engineering & Equipment Company, Pittsburgh, Penn.

we have just had the pleasure of inspecting, could be utilized.

Therefore, we will not presume to stand before this gathering of practical manufacturers and plant owners and attempt to discuss in detail or from a purely theoretical angle what you gentlemen have encountered through years of experience in your practical solutions of the problems encountered in bringing your industry to its present high state of development and potentialities of expansion. In this connection authoritative statistics divulge that there were made in Germany last year four billion sand-lime brick, which was a larger production than any preceding year.

There is undoubtedly a reason for this. Probably they too have transportation problems and are obliged to localize the industry and again it is more likely due to the better understanding of the possibilities and high qualities of a properly made sand-lime brick. The practical problems met with in the manufacture as previously stated have in the main been adequately met by yourselves but in this connection we venture the opinion that the possibilities of this line are practically unlimited and that your whole industry is as yet in its infancy.

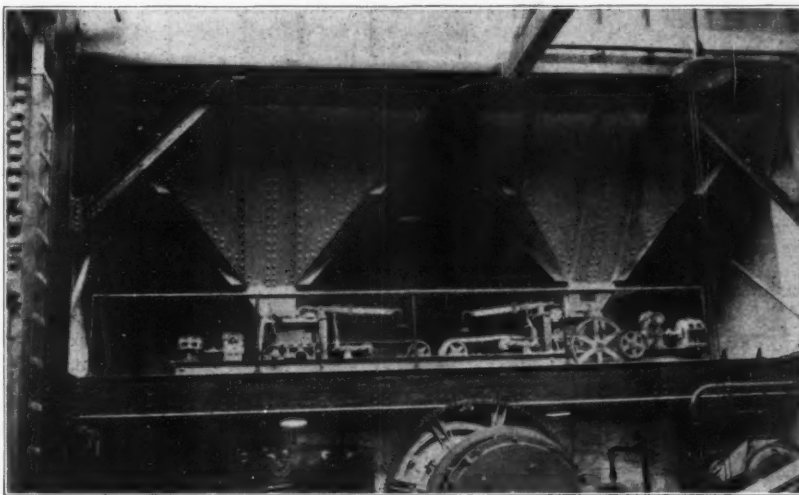
The combination of sand and lime in proper proportion and properly treated throughout your process has unlimited

possibilities and we have actually seen samples of various products made from sand and lime that were superior to natural stone deposits and which for durability, strength and beauty far surpass any other material.

It is not beside the point to believe that the future development of this industry will bring forth various products of a quality, durability and beauty commensurate with the most artistic architectural treatments which will put this industry on the plane in which it should properly function. As supporting evidence of this we have only to observe the permanent and beautiful buildings throughout this continent (we have many specific examples in this city of Dayton) for which the brick have been supplied by the sand-lime brick manufacturers.

Importance of Correct Proportioning

It would seem that the proper proportioning on a continuous basis and automatically with absolute accuracy, of the ingredients would bring about the highest development and stability along these lines. Exhaustive tests have proven that the proportions are not fixed and depend largely upon the chemical and physical characteristics of both the sand and the lime. Where accurate proportioning is accomplished on a basis for the best results, and this can be adhered to by mechanical means which would permit of no mistakes, and the structure of the brick provided for by proper grinding and treatments of the sand, we believe a great step toward the ultimate goal of this industry has been taken.



Bins and poidometers for sand and lime

The Schaffer Engineering and Equipment Co., which I have the honor to represent, manufactures a machine known as the "poidometer." This you have seen in operation at the Crume Brick Co. plant and have undoubtedly observed the possibilities in the way of labor saving, not to mention the possibilities of improvement in the quality of the product. I will not enter into a detailed discussion of these machines but we will be glad at any time to supply full details as to the possibilities of proper compounding by use of these machines. It is well to state that poidometers are continuous, automatic, operate with practically absolute accuracy and can be installed in any plant with very beneficial results.

It should be mentioned that by means of an accurate record of the various materials that have passed over our automatic weighing and proportioning machines, it would be a very simple matter

to establish research records which can be referred to over any period of years, and which by reason of the readings of these machines covering any desired unit of time will indicate the exact proportions used. These records will assist greatly in following up the exceptional successes and further it will be a very simple matter to keep records applicable to production cost sheets wherein the quantities of the materials used can be made instantly available.

These machines also act as a governor for the entire plant from said bank to finished product. The advantages of this should be more than apparent.

In conclusion, I desire to thank your President, Mr. Crume, for his exceptional courtesy in permitting us to bring poidometers to your attention under actual operating conditions and trust that this demonstration will be of benefit to you. In view of the courtesies shown us,

we wish to state that to members of this association any records or data which we can furnish along the lines of correct proportioning of materials or other operations, will be gladly submitted and we trust that you will not hesitate to communicate with us at any time you feel that our experience covering a wide variety of engineering operations can be of any value to you.

It has been a great pleasure to observe the hearty spirit of co-operation existing between the members of this association and the freedom with which ideas are interchanged and all information disseminated for the benefit of any association member. I have observed the remarkable spirit in which every assistance is given a new manufacturer and believe that this attitude especially at this particular time and under existing economical conditions could well be emulated by other associations in other lines of endeavor.

Grinding, Mixing Sand and Lime for Sand-Lime Brick*

Use of the Marathon (Rod) Mill—An Important Development in the Industry

THE MARATHON MILL is an invention of your humble servant during his 12 years of experience in mine operation to overcome the grief and high cost of crushing and pulverizing the coarse discharge from rock crushers to the necessary fineness of sand to release the gold, silver, copper, lead and other mineral values from the ores of western mines.

It was first patented about nine years ago, and other patents are still pending. It was so successful it made good right from its first use, and has since been adopted by some of the largest mining companies in the world.

It has proved equally efficient whether grinding the hardest flinty ores or softer rock, and by easy adjustments was able to deliver a finished product of any desired size, coarse, medium or fine, the first time through the mill, without screening and sending back oversize for re-grinding.

For Sand-Lime Brick

Your president, W. H. Crume, with the keen perception of the trained engineer, conceived the idea that the Marathon mill would be just as efficient in sand-lime brick production as in other fields, not alone for its grinding ability, but particularly in mixing, kneading and thoroughly

By Ernest C. Johnson
President, Marathon Mill and Machinery
Works, Champaign, Ill.

distributing the lime through the sand in such a way as to throw a film of lime around each particle of sand that would make a perfect binder and produce the strongest possible brick.

A 48-in. x 9-ft. mill was placed in a temporary setting to try it out alongside of one of the large wet pans, with the following results, conclusively determined: The dry pan was an intermittent "batch" mixer, doing no grinding of the part coarse gravel from their wash sand bank, and turning out a product containing a considerable number of lumps of uncrushed and unmixed lime, making weak spots and blemishes in the finished brick. The Marathon mill, on the other hand, was a continuous feed and discharge mill that, when steadily fed by a machine measuring exact proportions of sand and lime, constituted an absolutely automatic mechanical unit from the lime and sand storage to the press hoppers without any hand labor nor its fatal human element of inefficiency and mistakes.

Perfect Brick

The product from the Marathon mill proved all that Mr. Crume had hoped. The coarse, hard, flinty gravel was all

cracked to sharp-edged pieces of sufficient fineness. Most of the sand had also been cracked into two or more sharp-cornered finer particles and the whole was most thoroughly enveloped with a transparent moist film of lime due to the more or less water fed in the Marathon, depending upon the amount of moisture already in the sand. It was found that the mixing by the hundreds of steel bars in the mill was so thorough and complete that the moisture was evenly distributed and the lime was so pulverized and filmed that not a single white speck could be found with a magnifying glass. The finished brick proved to be the strongest ever produced as a result of the sand being sharp and being completely and thoroughly mixed and kneaded into the lime binder.

Horsepower and Capacity—Upkeep

It was also found that the Marathon mill took a little less horsepower than one of the dry pans and had a little greater capacity than both dry pans. From data as to wear of lining and Marathon steel grinding bars so far as yet obtainable, it is estimated the loss by wear at the present price of steel will not exceed two cents per thousand bricks. The only other wearing parts are the gear and steel pinion.

This was such an agreeable and satisfactory surprise it was at once realized they could not afford to run the dry pans

*Paper read at the annual convention of the Sand-Lime Brick Association, Dayton, Ohio, April 26, 1921.

any longer from a daily cost of operation standpoint, to say nothing about the inferior brick they produced, with their great wear and tear expense. So it was decided to scrap the dry pans and redesign and rebuild the entire plant along lines suggested by the revolutionary accomplishments of the Marathon mill. It is indeed fortunate that the attending members of your Association have the opportunity today of witnessing a demonstration of the Marathon mill and operation of the new plant of the Crume Brick Co., which is the "Last Word" in sand-lime brick production. Two other large companies have recently ordered Marathon mills for new plants they are building after plans similar to those of the Crume Brick Co.

The Greenville Gravel Co. to Erect Plant at Massillon, O.

THE GREENVILLE GRAVEL CO., of Greenville, Ohio, has acquired title to over 100 acres of gravel deposit adjacent to Massillon, and intends erecting a large washing and screening sand and gravel plant in the near future. The plant will be located on the Baltimore & Ohio Railroad, and will be erected at a cost of approximately \$250,000, according to a Massillon newspaper.

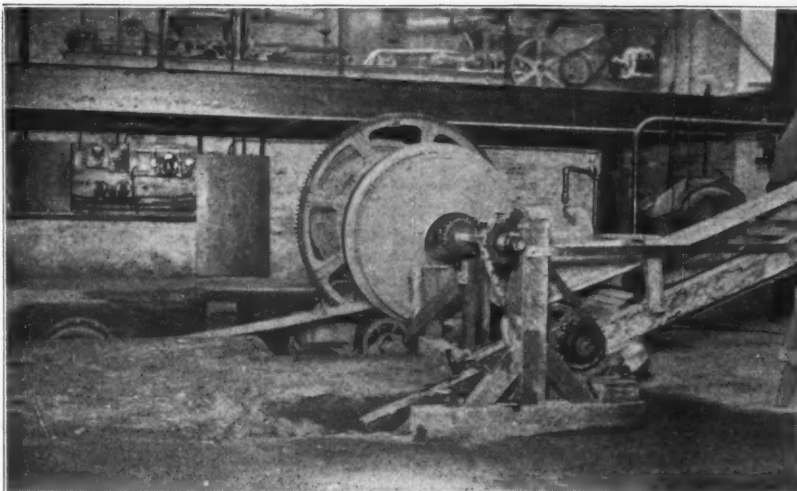
The Greenville Gravel Co., with its subsidiary companies, is recognized as one of the largest sand and gravel concerns in the United States, owning and operating plants in five states, extending from Chicago, Ill., to Rochester, N. Y., and as far south as Arkansas. These holdings include the Greenville Gravel Co., Detroit-Greenville Gravel Co., Richmond-Greenville Gravel Co., Kalamazoo-Greenville Gravel Co., Arkansas Gravel Co., Logansport-Greenville Gravel Co., Greenville Mfg. Co. and the Allied Belting Co. All of these concerns have their home office at Greenville.

The local company will be known as the Massillon-Greenville Gravel Co. and the plant will have a capacity of about 100 cars per day.

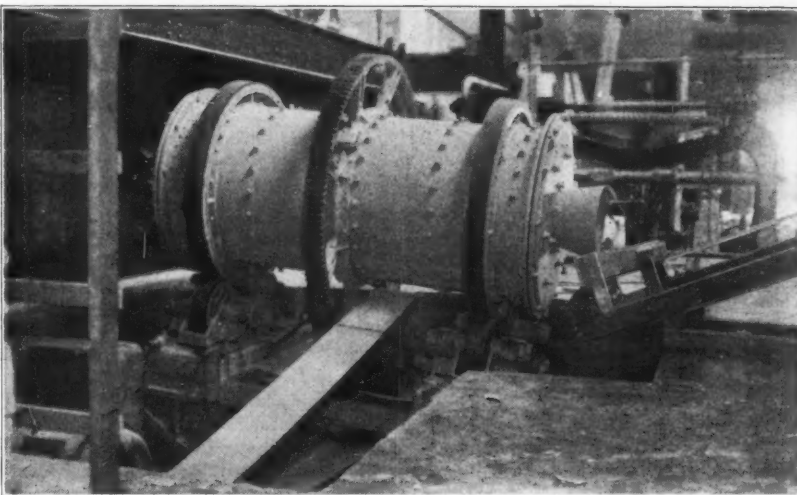
F. D. Coppock is the president of the parent company. Guy C. Baker is the vice-president. Associated in the Massillon company will be F. R. Jones, contractor; J. B. Stewart, counsel for the Cincinnati Traction Co., and Attorney W. B. Quinn of Canton, who represents the company locally.

Sand and Gravel Business Good in Camden, Tenn.

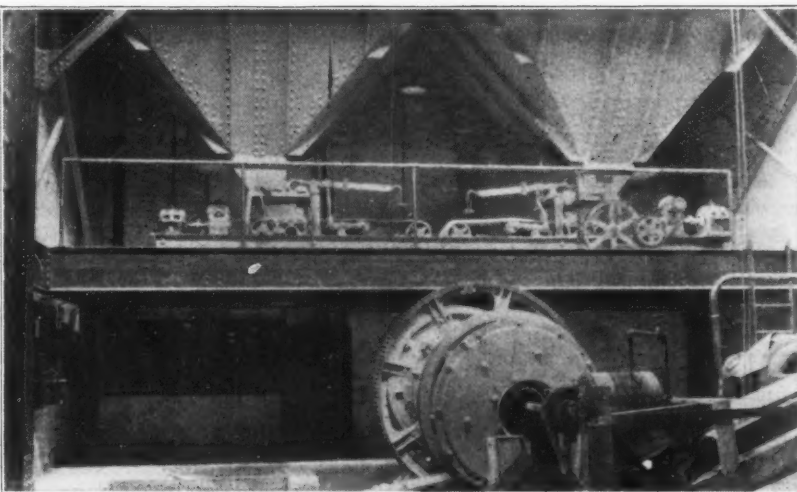
CAMDEN, Tenn., has been known for several years as the road gravel center of all West Tennessee, but recently it has been made more so by other companies prospecting for gravel pits. Camden has now in operation three pits and as many more are under way.



Marathon mill and belt conveyor to storage tanks



Marathon mill, showing bed and drive



Marathon mill and Schaffer poidometers

Eastern Building Situation

Price Cuts and Prospects of Reduced Freight Rates Have Stifled Nearly All Present Building Initiative

NO SATISFYING ANSWER has been obtained by building material dealers who have been slashing their prices to consumers as to why construction work still stays dormant, says the Dow Service Daily Building Reports.

The fact is, nevertheless, building construction work shows indication at this time of remaining practically inactive for an indefinite time. Even in habitation building, constituting as it does practically all the activity there is in current building call for materials for immediate delivery, there is not anywhere near the volume of actual contract award that there should be at this time of the year with the October renting season fast approaching. Still building material price quotations are being cut, almost the entire market showing either direct or indirect price reduction as the week closed. Instead of stimulating new business these price-cuts are having the opposite effect of encouraging postponement of purchases by those buyers who attempt to feel the market value. Yet further price-cuts are imminent, especially if freight rates on building materials are lowered.

The only sound conclusion that can be arrived at, after a close scrutiny of all the economic factors that have contributed to the making of present market conditions is that price-cutting, as now being carried on, is due to the great impetus given to the building material market in its entirety by public opinion, lowering of other commodity prices and general readjustment. Failing to stimulate new and greater demand via building material price-cuts distributors started out to under sell their competitors only to find that when all the building material prices were in the prospective builder decided that the cut was still not sufficient and withdrew his enterprise from the present market.

It was the turn for the prospective builder to retaliate for the general price "snowballing" he suffered a year ago. It is the apparent intention of the prospective builder to see the building material market clear down to the pit just as he found himself projected to the peak of the market last year. The prospective builder finally balked at the high price and he has now balked at what is evidently the bottom price. There was a rest period when the building investor tired of paying high prices and there is now in process a similar rest period to mark the fact that the building investment public is going to make thoroughly

sure that the bottom actually has been reached.

The building investor has got the whip hand of the situation, too. He knows that there is now little chance of getting any sizeable habitation building under way and completed in time for the autumn renting season so that New York has got to go through another housing-shortage winter and unless this rest period is brought to a halt before the first of September there will be another house-shortage period in 1922. House shortages bring high rents, high rents make a potential demand for speculative building operations and speculative building construction movements put real backbone into the building material manufacturing, handling and distributing markets.

There is no spine to the building material market in any branch from architectural terra cotta to zinc today. There will be none until freight rates on building material are reduced and until it becomes apparent whether the wage scale of building artisans in New York are to remain as they are or are to be reduced.

The most liberal freight rate decrease would register in the lowering of the cost of erecting an average dwelling not more than \$50. The lowering of the wage scale of New York building artisans would probably not be more than 10 per cent of the present scale and unless the cut was at least 25 per cent the difference would hardly be sufficient to warrant the long protracted struggle and consequent disruption of building of all kinds. The scarcity of skilled building artisans is already too serious a problem and with immigration restricted the situation is not going to be helped. Young men today, when picking their vocations, select the white collar trades in preference to a business life in overalls. Were it not for the continuation schools and the trade classes building investors would be looking in vain for skilled American building artisans a generation hence. This fact is even being felt now with a large section of the building trades idle.

At the same time these factors are predominant in the building market, there is a great inflow of gold to this country. Gold in excessive quantities invariably results in inflation. European countries are getting back on their feet again faster than Americans were led to believe could be possible. The rates of international exchange are gradually approaching trading levels. Industry will presently begin to feel the pulse of increased activity. The railroads will likewise begin soon to

feel the change. Idle freight cars are fewer even now. Industry and the railroads presently will find that they have to have more facilities. That will mean building materials in vast quantity. Such demand will come with the building material manufacturer and dealer without stocks. Such a change can come about in a few months, now that the start has been made. If general building investors should also awake to the fact that industry and railroads are vying with them for materials, big-order business will again count most and small-order business will again have to wait.

New Talc Mine for North Carolina

A NEW TALC mine will be opened at Hemp, N. C., and a mill installed at Glendon, according to a local newspaper report.

The Talc Products Co., a New York corporation, operates a mine at Glendon, and while the corporation owns large properties in that section, it has not been able to keep up with its orders, it is said.

A party composed of officials of the company, Charles A. Breitang, of New York, general manager; Charles Ort, of Butler, Pa., and J. N. A. Blair, of New York, directors of the Talc Products Co.; R. B. Ladoo, of the Bureau of Mines at Washington, with several Moore County men, have gone over the property and as a result have commenced building a mill at Glendon with a capacity of 100 tons per day. A new method of handling the rock, the Dorr process has been discovered and by hauling the ore from the Hemp mines to the Glendon mills, the company will operate one of the largest talc plants in America.

Alsen Cement Plant to Resume Operations

THE PLANT of the Alsen Cement Co. of America, Alsen, N. Y., will resume operations at an early date according to Mr. Rosoff, of the Rosoff Engineering Co. The Rosoff Engineering Co. was the successful bidder on the Alsen plant which was sold recently at auction for \$301,000.

M. E. Jenkins, of the Rosoff Engineering Co., is making an inventory of the plant. Mr. Grainer, superintendent of the plant, is placing the plant in good working condition and perfecting the plant organization.

The Alsen Cement Co. was capitalized for \$2,400,000 and had a capacity of 1,000,000 barrels per annum. The plant is a dry process plant with seven 7x120-ft. kilns. The former officers were: Lucian Alsen, president; W. P. Corbett, vice-president and secretary; Frank Stranahan, treasurer, and George Grainer, superintendent.



Editorial Comment



While the national associations in the mineral aggregate industry are co-operating with other building material producers to interest the railway executives in wholesale freight-rate reductions, the various local associations and groups of producers are making headway in getting their particular rates actually reduced. Undoubtedly this is the logical way to handle the situation, although many mineral aggregate producers feel as we did two weeks ago, that the case of freight rates on mineral aggregates as a national issue should stand alone on its own merits.

What the national associations can do and are doing is to cultivate and promote sentiment for lower rates both with the railway executives, the Government, and the public. Freight rates on nearly all building materials are out of all proportion to the values of these commodities and are without doubt among the factors preventing a resumption of construction work.

The work that the local associations are doing to get favorable decisions from state public utility and railroad commissions, and in dealing direct with railway traffic officials, all helps the national cause tremendously and is work that the national associations could not accomplish for them.

The resignation with which the railways have accepted the decisions of the New York, Wisconsin and other state commissions within the last few weeks is in all probability due to the good work done by the national associations in bringing about national sentiment for lower rates on these commodities.

The proof of this lies in the experience of some of the local groups like the Indiana Sand and Gravel Producers' Association. This association acted without delay, after the 40 per cent increase of last August, and soon had an order from their state public utility commission reducing the rates on sand, gravel and crushed stone. The railways promptly appealed to the Federal courts and obtained a restraining order which will not permit the Indiana commission to enforce its order. Producers in Kentucky and possibly other states had similar experiences.

Now, the railways are not appealing from these state decisions because they know that the merits of the mineral aggregate case are so well and so widely known—largely through the efforts of the national associations—that they cannot permanently stave off rate reductions on these commodities. Doubtless railway officers themselves are beginning to be convinced of the necessity for lower rates if they are going to handle this business.

Thus, the results of the national association's work are important to every producer, though up to this time they have been rather intangible.

Statistics recently announced show that the use of agricultural gypsum—ground gypsum rock, or land plaster—increased in 1920 nearly 200 per cent—from 40,000 tons in 1919 to 107,443 tons in 1920. Considered as a fertilizer in something the same class as agricultural limestone, this increase is quite remarkable and can be traced directly to the activities of the Gypsum Industries Association. The outlook is particularly gratifying because it has taken a lot of pep and enthusiasm on the part of the Gypsum Industries Association's staff to really interest its own members in promoting this product.

Wide circulation is being given to a statement by Julius Kruttschnitt, chairman of the board of directors of the Southern Pacific Ry., to the effect that "freight rates are not responsible for the present business depression."

His conclusions are based on broad national statistics and on examples of some few commodities like cotton and lemons. It is particularly noticeable in all the defense offered by the railways that the subject of rates on building materials are never mentioned.

Along with the bulletin from the Association of Railway Executives containing Mr. Kruttschnitt's statement is a bulletin urging a reduction in railroad wages and pointing out inconsistencies and "horrible examples" of what the present wages and labor rulings have meant. The railway executives have consistently made lower wages a condition of lower rates and have not shown, with the exception of the New Haven railroad, any inclination to consider a reduction of rates on specific commodities or in specific cases, on their merits, nor on business-getting grounds.

Any reduction of rates, or promise of reduction of rates, that the producers of building materials may exact from the railway executives at the conference in Washington, D. C., June 2, will probably depend upon railway wage reductions. But, since the Railway Labor Board has already (May 17) announced that it will order reductions in all railway labor July 1, there is hardly any excuse left for not reducing the rates on building materials.

The railways have been successful in using the agitation for lower freight rates, even on such commodities as sand and gravel, to force this wage reduction. Probably no sand and gravel producer denies that a railway wage reduction is to be desired and is necessary, but they rightfully resent the use of their case for this purpose by the railways because there are far better reasons why mineral aggregate rates should be reduced, wage reductions or no wage reductions.



Accident Prevention



The Foreman's Place in Accident Prevention

By C. W. Price, General Manager of the National Safety Council

WHAT QUALIFICATIONS must a foreman have to get results in safety? First, he must believe in accident prevention just as he believes in anything else that prevents waste and increases the efficiency of his department. Second, he must really care for his men as human beings, be sincerely interested in their welfare, and feel his moral responsibility to protect them. He must be a leader, capable of winning the confidence of his men, so they will pull with him. He must be a "regular fellow", the kind of man the workmen instinctively respect. If he secures the wholehearted support of his men he will succeed; if not, he will fail and nothing can save him.

The foreman must know safety—must inform himself, with the assistance of the safety supervisor, regarding the best standards developed in other companies where conditions are similar to those in his own department.

Backbone is one indispensable part of the structure of a safe foreman. When he announces that, beginning today, safety is to be first and production second, he must convince his men that he means just that; he must leave no room for doubt.

Finally, the foreman must be square with his men, and must be sincerely appreciative of every effort or suggestion they make, and must show his appreciation. In other words, the foreman must win his men to safety.

What a Foreman Can Do

If the foreman is to get his men intelligently interested in safety, he must keep close to them—must watch their habits, study their jobs, make them feel that he understands their problems. He must carefully and constantly instruct his men in accident prevention, especially the new men; not simply tell them to "be careful", but warn them in regard to the particular hazards of their jobs and give them specific directions as to the safe methods of work.

The foreman can take a new man and in a few minutes, with tact and a friendly attitude, impress that man with the fact that here is a shop where everybody is pulling together to keep people from being injured; the company is spending money to make the buildings and machines safe, he is doing his part, and the workmen are doing their part. This gives

the new man a splendid start in the right direction.

From the beginning, the foreman should understand and present safety to the workmen as a business proposition—not as a frill or a fad. The reduction in accidents and the saving in money for both the employer and the workmen of many of the companies actively engaged in this work prove that it is an indispensable part of every efficient shop organization.

Inspection

The foreman should know his department. Through regular inspection and constant daily watchfulness he should know every dangerous place or practice.

The responsibility of seeing that guards are provided for dangerous places is placed squarely on the foreman, and he should act promptly. Delay often destroys the workmen's confidence in safety. The foreman should see that the guards are kept in repair and are used by the men.

The keeping of tools and machines in proper repair and adjustment is clearly another one of the foreman's duties. He can render most valuable service to safety by vigilance in this work.

The effectiveness of the first aid department in caring for the workmen and preventing infection depends largely on the foreman's co-operation in instruction and disciplining them. He must make them understand that minor injuries must receive prompt attention, and must show them why a slight break of the skin, if neglected, may cause blood poison and death.

The success of workmen's inspection committees depends wholly on whether the foreman believes in the committee idea—whether he properly instructs and encourages the committeemen from week to week. Here is where he can exert a direct and telling influence for safety.

(To be concluded)

Handling Men

By W. Dean Keefer, Safety Engineer,
National Safety Council

MEN SELECTED AS FOREMEN

usually have greater mechanical and executive ability than the men under them. The best foremen have other good qualities also, such as tact, sincerity, and loyalty, which inspire confidence and make their men naturally look up to and respect them. Co-operation depends on confidence and both of these are necessary in successfully dealing with men.

Slave-Driving Methods

Foremen should "get on well" with

others and should be able to lead rather than drive their workmen. The old idea of management was based on threats, bad temper, fear, punishment, and arbitrary discharge; but this is gradually giving way to a new and better system of confidence, mutual understanding, friendliness, and co-operation. It is easy to tell which system a foreman employs, simply by noting why his men quit, why they are discharged, or why a certain man fails under one foreman and does well under another.

Fear has no place in the modern successful business organization. Workmen should not feel any hesitation in coming to the foreman with their troubles, their successes, and their ambitions; they should look upon him as their friend and advisor.

A tactful foreman is one who can handle men without being offensive in the use of authority. Many foremen of the old class say, "If you cripple our authority, if you cut down the power we have over our men, then you cannot hold us responsible for results." Many others have learned, however, that there is something much more effective and lasting than the mere display of temper, brute force, or police authority. Holding men down and keeping their noses to the grindstone is not the real duty of foremen. Foremen should not be slave drivers, but rather "partners"; partners of both the manager and the men. Profanity and anger are signs of weakness and successful men seldom indulge in either.

(To be continued)

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General Market News



Conditions in Lehigh Valley Cement District

THE CEMENT DISTRICT in the Lehigh Valley section of Pennsylvania is exhibiting rather a changed aspect, and the past two weeks show indications of curtailment in operations in different quarters. The recession is the result of the lack of stability in the cement markets and the call for the material, referred to in recent issues of ROCK PRODUCTS. The weeks past have shown a good rate of production and have allowed the companies to stock up to a good extent; the mills have been able to meet all current requirements and are in position to handle immediate orders.

The continuance of the unfavorable industrial conditions in the different important construction centers, with the rather slow, but nevertheless encouraging, resumption of construction work, have had the effect of slowing down a number of mills. Moreover, with possibility of an early reduction in freight rates, there is an attitude on the part of the buyers to defer shipments, and many postponements have been recorded. New orders, through the same cause, are being retarded, and the immediate outlook is not as bright as it might be. Things will have to right themselves, as producers know, before the situation is cleared.

The call for cement at New York and vicinity continues in a favorable way. The spring season has had the effect of stimulating prospective builders, particularly in the line of house and apartment construction, and these branches of the industry are taking the lead in the demand for material. Prices have again come down under the pressure exerted and in advance of the expectations of many dealers. Quotations are now \$2.80 a barrel, net, as against a previous figure of \$3.10, net, delivered. The bag rebate remains at 10 cents, and this allowance will undoubtedly remain standard. The suburban sections continue to hold the peak of demand and dealers are showing faith in the future by ordering well in excess of current requirements.

In discussing the cement bag question, Tomkins Brothers, Newark, N. J., leading mason material dealers in wholesale and export, say that the reduction from 25 to 10 cents means a considerable difference in the amount of money which the purchaser of a car of material must tie up temporarily in bags. The manufacturers still have large quantities of bags, purchased last year at top notch prices, but as the present market for new bags probably will hold for some time,

no further change in this direction is looked for, unless by some unforeseen cause the cost of jute and cotton mounts skyward again.

New England dealers have reduced quotations on cement during the past fortnight, the decline being from \$4.20 a barrel in cloth, four sacks to the barrel, to \$3.90. This is not quite the level that New York has reached, but the present trend seems downward, and it is likely that other changes will be announced at an early date. In paper sacks, the material is placed at \$3.75 a barrel delivered. Cement at Providence, R. I., holds at \$4.60 a barrel delivered, with prevailing bag rebate of 22½ cents. A lower figure seems likely at a very early date, and a number of dealers are now pricing a shade lower.

At Northampton, Pa., the Atlas Portland Cement Co. is maintaining operations at reduced capacity without any immediate change in sight. The Lehigh Portland Cement Co. shows no intention of slackening production at this writing. The Coplay Cement Co. has arranged for a reduction of output at its Mill B at Coplay, and about 100 men have been thrown out of work. It is indefinite just how long the mill will operate at low capacity. The majority of the smaller companies are keeping up manufacture at a fair rate, and shipments during the past fortnight from the Coplay section have been averaging about 100 carloads a day.

Indiana Cut-Stone Quarry Laborers Refuse Wage Reduction

ABOUT 800 limestone workmen are on strike in the Bloomington, Ind., region as a result of a dispute with the operators of the quarries over a wage reduction. The unions refused to accept the wage cut. The schedule of the operators is to reduce wages of stone cutters to \$1 an hour, a cut of 12½ cents for a nine-hour day, and planermen 7½ cents an hour, making their wages 82 cents an hour. Business has been very quiet in the district, as operators assert prices are too high to get orders.

About 250 cutters, planermen and diamond stone sawyers refused to begin work in the quarries in the Bedford, Ind., field, May 2. The trouble is a disagreement between the men and the operators. The latter are making an effort to operate an open shop.

Announcement has been made that because of the lack of demand for stone, the Indiana Quarries Co., the largest quarrying concern in the Bedford, Ind., district,

has been compelled to shut down more than 25 channeling machines and approximately 200 men have been laid off. This is the first time in the history of the stone industry that the company has been forced to close at this time of the year.

New Haven Railroad Voluntarily Reduces Rates on Aggregates

THE REVISION of freight rates on sand, gravel, crushed stone and slag, of which President Pierson of the New York, New Haven & Hartford R. R. wrote to ROCK PRODUCTS (see issue of January 15, 1921, page 53), has at last been announced.

The reduction will go into effect on the New Haven as soon as that road can file its tariffs, to become operative on five days' notice. The lowered rates will become operative probably about May 15.

Special sixth section permission has been given the New Haven by the Interstate Commerce Commission, the permit being No. 52,806, dated May 2, but not actually put out until two days later. Generally speaking, the reduction is two cents per 100 pounds, or 20 cents a ton, which happens to be the amount added to the rates on such materials by General Order No. 28 of June 25, 1918. However, the reductions are not uniform, nor are they on a percentage basis. They appear to be made with a view to inducing the business to move, from established sand and gravel pits, and rock crushing plants; rather than force those desiring to use such materials to either forego the construction of roads or buildings this year, or obtain their supplies from new plants established through the use of new capital which, in the interest of the New Haven and New England, might be believed to be better invested, if put into roads and buildings in the form of materials purchased at the established points of origin.

Activity in Sand and Gravel at Pittsburgh

SAND AND GRAVEL PRODUCTION continues active in the Pittsburgh, Pa., districts. The Keystone Sand & Gravel Co. is operating a digger at Coraopolis, and daily loads of material are being towed into the Pittsburgh markets. The Rodgers Sand Co. is working at Ambridge, and the towboat "Rival" of this company is hauling a considerable tonnage for the local trade. There is no sign of any curtailment and the call for production holds up well.

New Machinery and Equipment

Mechanical Loading in Underground Quarrying

By W. Whaley,

Myers-Whaley Co., Knoxville, Tenn.

QUARRYING, by which we understand the operation of winning non-metallic rock from the earth, is very often advantageously conducted by underground operations and very often these underground operations compare favorably with the cost of quarrying in open pit. One of the disadvantages which popularly is supposed to exist is that quarrying underground entails hand shoveling, whereas, quarrying on the surface will permit the use of mechanical loading, such as steam shovel work. This is not entirely correct, as mining or quarrying of non-metallic rocks underground presents no greater difficulty than similar handling of metallic ores, and is usually very much simpler, and standardized machines are available for underground loading.

During the past eight years considerable advance has been made in the art of loading mechanically underground and in restricted spaces. The Myers-Whaley shoveling machine was the first successful machine to accomplish this work, and it is now quite firmly established as the most efficient and economical method of loading materials underground.

Myers-Whaley shovels are now employed in the following classes of non-metallic mines or underground quarries.

Rock Salt—in which the seam is about 8 ft. thick, practically flat, and in which no timbering is required owing to roof conditions. In these mines, rooms are turned off, chambers driven in a manner somewhat similar to coal mining, and the tonnage loaded by a machine in this class of work runs from 200 to 260 tons per working shift. Sixteen machines are now in use in two mines of this description.

Shale Mine—where shale occurs underground and is desired for its quality or accessibility to the manufacturing plant, the loading of shale can be economically accomplished by the use of Myers-Whaley shovels. One company with such a mine is now using machines to load their entire output. It started in with one machine and now has four. The conditions are: Thickness of seam, 12 to 14 ft.; cars, 2-ton capacity; track gauge, 30-in.; power, 500 volts D.C. The cost of loading is about half that of loading by hand.

Limestone—A cement company having a limestone quarry underground in connection with their cement factory, has three Myers-Whaley machines which load their entire requirements. The machines are operated on a contract basis, the operator and his crew being paid a certain amount

per ton loaded. This results in a very economical and efficient operation. This company reports that in July, 1920, one of their machines averaged 260 tons per shift per day for the entire month, not an unusual or sporadic accomplishment. The cost of loading with a machine is less than half that of loading by hand, and under these conditions material can be loaded by a machine, including all items of upkeep, interest, depreciation, etc., for less than 15 cents per ton.

Gypsum—Gypsum, which occurs in nearly horizontal seams, can be handled with great facility and economy by shoveling machines. Two companies are now using Myers-Whaley shovels for this purpose.

In addition to the few instances mentioned above, and which we think are particularly interesting to readers of *Rock Products*, it is interesting to know that over 100 Myers-Whaley No. 4 size machines have been built and installed, and the range of service covers the loading of all classes of material—copper, iron, lead, zinc, gold, silver, rock salt, gypsum, shale, limestone, coal, etc. To those who are not familiar with the machine a brief description follows, which may be interesting:

Description of Machine

The machine consists of an automatic shovel, mounted upon the forward end



Myers-Whaley shoveling machine loading limestone. Note size of stone handled

of a swinging jib, which is pivoted at its rear end to the main frame of the machine. This jib section carries an armored belt conveyor, which receives the material from the automatic shovel and delivers it to a second armored belt conveyor mounted upon a rear conveyor, which is also pivoted for lateral movement at the same point upon the main frame. The truck wheels carrying the machine are driven by a reversing clutch, worm and chain drive, so that the machine can be moved forward and backward at the will of the operator. The operator is mounted upon a platform at the right hand side of the jib section, so that he can see the shovel and guide it to its work. There are only two levers used in the operation of the machine. By one of these the operator moves the entire machine forward and backward. By the other one he swings the jib section. These two movements give complete control and enable him to direct the shovel just as a man would direct a hand shovel. The lateral adjustment of the rear conveyor enables the machine to load either

directly behind it or into cars standing on parallel tracks.

The entire machine is driven by one motor, 20-h.p., mounted upon the main frame. All working parts of the machine are well protected from the material being handled. The gears are cut steel, hardened, and operate in oil-tight cases, and the chains driving the crankshaft are also mounted in oil cases. The construction of the Myers-Whaley machine is first-class in every particular. The use of steel castings and forgings permit the embodiment of great power and durability in a machine of moderate weight, and which can be handled easily over the ordinary mine tracks. The entire machine weighs about 18,500 lbs. in working order, and experience shows that 25 to 30-lb. rail for tracks is satisfactory. By means of the propelling mechanism the machine is moved from one stope or room to another part of the mine under its own power expeditiously and easily. The capacity of the machine averages about one ton per minute under ordinary conditions, and in very heavy ore the machine has

loaded a maximum of over two tons per minute. The daily capacity, however, is dependent upon local conditions and facilities for removing the material from the machine.

The photographs herewith show machines operating in shale and limestone.

Record on Limestone*

The figures below were obtained by actually timing all operations:

No. cars loaded	78
Actual time loading	3h 1m 10s
Time shifting	2h 39m 40s
Tons loaded	205
Time started loading	8h 01m 00s
Stop for day	4h 00m 00s
Total time	7h 59m 00s
Time and per cent of total time used in:	
Actual loading	3h 10m 10s—39.7%
For shifting	2h 39m 40s—33.3%
Lost as listed below	2h 9m 10s—27.0%
Total time	7h 59m 00s—100%
Average time loading one car	2.44m
Average time shifting car	2.05m
Average tons per car	2.63
Time lost, various causes:	
Pulling down stone	22m 15s
Lunch	11m 55s
Machine off track†	10m 50s
Machine off track†	7m 00s
Machine off track†	6m 25s
Dinner	30m 00s
Repairing track that had spread	22m 00s
Pulling down stone	14m 00s
Machine off track	4m 45s

*Extract from report of Myers-Whaley engineer.

†Due to track spreading.



The shoveling machine loading shale



The Rock Products Market



Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Blakeslee, N. Y.	1.00	1.00	1.50	1.50	1.50	
Buffalo, N. Y.			1.30 per net ton, all sizes			
Burlington, Vt.	1.00	1.75	2.50	2.00	2.00	
Chaumont, N. Y.	1.25	1.25	1.75	1.50	1.50	
Cobleskill, N. Y.	.90	1.80	1.70	1.60	1.60	
Eastern Penna.	1.00		1.85	1.85	1.85	
Munns, N. Y.	1.00		Other sizes 1.50			
Walford, Pa.	1.40	1.60	1.75	1.75	1.60	1.60
Western New York	.70	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Alden, Ia.	.80@1.00	.80@1.00	1.50	1.45		
Alton, Ill.	2.00		1.50	1.50		
Bettendorf, Ia.		All sizes, 2.00 cu. yd. f.o.b. quarry				
Buffalo, Ia.	1.00	1.35	1.45	1.25	1.35	1.35
Chicago, Ill.	1.20	1.60	1.20	1.20	1.20	1.20
Columbia, Ill.	2.15	1.90	2.00	2.00	1.90	1.90
Davenport, Ia.	1.50*	1.50*	1.50*	1.40*		
Dundas, Ont.	1.00	1.00	1.50	1.50	1.25	1.20
Eden and Knowles, Wis.	1.30	1.30	1.30	1.30	1.30	
Greencastle, Ind.	1.75	1.35	1.25	1.20	1.20	1.20
Illinois, Southern	2.00	1.75	1.75	1.50		
Kokomo, Ind.	1.10	1.25	1.25	1.10	1.10	1.10
Krause or Columbia, Ill.	1.80	1.30	1.50	1.40	1.30	1.30
Lannon, Wis.	1.00	1.10	1.10	1.10	1.10	1.10
Marblehead and Brillion, Wis.	1.10		1.20	1.10	1.10	
Montrose, Ia.	1.35	1.75	1.75@1.85	1.75	1.65@1.75	
Oshkosh, Wis.			1.40 per ton, all sizes			
River Rouge, Mich.	1.50	1.65	1.65	1.50	1.50	1.50
St. Louis, Mo.	.60	1.60				
Sheboygan, Wis.	1.25	1.25	1.25	1.25	1.25	1.25
Stolle, Ill. (I. C. R. R.)	2.25		1.75	1.75	1.75	1.75
Stone City, Ia.	.60		1.55	1.35	1.45	
Toronto, Canada	1.90	2.40	2.40	2.40	2.15	2.10@2.15
SOUTHERN:						
Cartersville, Ga.			1.85	1.60	1.60	
Chico, Tex.			1.00	1.50	1.25	1.10@1.25
Columbia, S. C.	1.00@1.25		3.50	3.50		
El Paso, Tex.	1.00	1.00	1.00	1.00	1.00	
Fort Springs, W. Va.	1.40	1.60	1.75	1.75	1.45	
Ladds, Ga.	1.75	1.75	1.75	2.00	2.00	
New Braunfels, Tex.	.60	1.50	1.50	1.25	1.25	1.25
Portland, Ga.	.60@.75		All other sizes 1.60@1.75			
WESTERN:						
Atchison, Kans.	.50	1.10	1.10	1.10	1.10	1.10
Blue Springs and Wymore, Neb.	.20	1.65	1.65	1.60@1.65	1.45@1.50	1.40
Cape Girardeau, Mo.	1.50		1.50	1.50	1.25	
Kansas City, Mo.	1.00	2.00	2.00	2.00	2.00	2.00

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Baltimore, Md.	1.25	2.50	2.35	2.25	2.00@2.25	2.00
Bernardsville, N. J.	2.00	2.20	2.00	1.80	1.50	
Brantford, Conn.	.80	1.95	1.80	1.60	1.40	
Bround Brook, N. J.	2.00	2.30	2.00	1.75	1.75	
Dresser Jct., Minn.	1.00	2.45	2.45	2.30	2.00	
Duluth, Minn.	.75@1.00	2.25	1.90@2.00	1.40@1.50	1.40@1.50	1.50
Dwight Station, Calif.			.75@1.00—all sizes			
E. Summit, N. J.	2.10	2.35	2.15	1.75	1.75	
Eastern Mass.	.60	1.95	1.75	1.50	1.50	1.50
Eastern Penna.	1.60	2.25	1.95	1.80	1.80	1.75
New Britain, Middlefield, Rocky Hill, Meriden, Conn.	.60@1.00	1.60@1.80	1.60@1.80	1.40@1.50	1.20@1.30	
Oakland, Calif.	1.10	1.10	1.10	1.10	1.10	1.10
Richmond, Calif.	.50*		1.75*	1.50*	1.50*	
San Diego, Calif.	.50@.70	1.45@1.75	1.40@1.70	1.30@1.60	1.25@1.55	1.25@1.55
Springfield, N. J.	2.15	2.35	2.15	2.00	1.85	1.75
Westfield, Mass.	.60	1.35	1.30	1.20	1.20	

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Ableman, Wis.	1.60		1.30	1.50	1.20	
Alexandria Bay, N. Y.	1.60		1.30	1.50	1.20	
Baltimore, Md.—Gneiss	1.00	2.75	2.40	2.20	2.10	1.75
Berlin, Wis.	1.60		1.40	1.50	1.30	
Columbia, S. C.—Granite	.75		2.75	2.50	2.35	
Dell Rapids, S. D.	1.00		2.10	2.10	2.10	
Dundas, Ont.—Flint	1.10	1.10	1.10	1.10	1.10	1.10
Eastern Penna.—Sandstone	1.20	2.00	2.00	1.70	1.70	1.70
Eastern Penna.—Quartzite	.90	1.70	1.55	1.20	1.20	1.10
Holton, Ga.—Granite	.40		2.50	2.25	2.25	2.00
Lorville, Wis.	1.60		1.30	1.50	1.20	
Los Angeles, Cal.—Granite		1.25@1.50	1.15@1.40	1.15@1.40		
Macon, Ga.—Granite	.50		2.50	2.25	2.00	2.00
Middlebrook, Mo.—Granite	3.50@4.00			2.00@2.25		1.25@1.75
Sioux Falls, S. D.	1.00		2.00	2.10	2.00	
Red Granite, Wis.	1.60		1.30	1.50	1.20	
Stockbridge, Ga.—Granite	.50	2.00	1.90	1.75	1.75	
Utley, Wis.	1.60		1.30	1.50	1.20	

*Cubic yard. †Agr. lime. ||R. R. ballast. §Flux †Rip-rap. a 3-inch and less.

Agricultural Limestone

EASTERN:

Chaumont, N. Y. — Analysis, 95% CaCO ₃ , 1.14% MgCO ₃ —Thru 100 mesh; sacks, 4.50; bulk.....	2.75
Grove City, Pa. — Analysis, 94.75% CaCO ₃ , 1.20% MgCO ₃ —70% thru 100 mesh; 80 lb. ppr., 5.50; bulk.....	4.50
Jamesville, N. Y. — Analysis, 89.25% CaCO ₃ , 5.25% MgCO ₃ ; sacks, 4.50; bulk.....	2.75
New Castle, Pa.—85% CaCO ₃ , 1.4% MgCO ₃ —75% thru 100 mesh, 84% thru 50 mesh, 100% thru 4 mesh; sacks, 5.00; bulk.....	3.25
Syracuse, N. Y. — Analysis, 90% carbonates—50% thru 100 mesh, 90% thru 50 mesh; sacks, 3.50; bulk.....	2.75
Texas, Md.—Analysis, 58.02% CaCO ₃ , 37.3% MgCO ₃ —50% thru 50 mesh; bags, 4.25; bulk.....	2.50
Walford, Pa. — 50% thru 100 mesh, 60% thru 50 mesh, 100% thru 10 mesh; sacks, 4.75; bulk.....	3.00
West Stockbridge, Mass., Danbury, Conn., North Pownal, Vt.—Analysis, 90% CaCO ₃ —90% thru 100 mesh; paper bags, 6.25—90% thru 50 mesh; paper bags, 5.25; bulk.....	3.25
West Stockbridge, Mass.—Analysis, 95% combined carbonates; 33% thru 200 mesh, 66% thru 100 mesh, 100% thru 20 mesh; sacks 5.25@5.50; bulk.....	3.25
Williamsport, Pa. — Analysis, 88-90% CaCO ₃ , 3-4% MgCO ₃ —50% thru 50 mesh; paper, 5.50; bulk.....	4.00
CENTRAL:	
Alden, Ia.—Analysis, 99.16% CaCO ₃.....	.80
Alton, Ill. — Analysis, 96% CaCO ₃ , 0.3% MgCO ₃ —50% thru 4 mesh.....	4.50
Bedford, Ind. — Analysis, equivalent 98.5% CaCO ₃ —90% thru 100 mesh.....	1.60@2.00
Belleville, Ont. — Analysis, 90.9% CaCO ₃ , 1.15% MgCO ₃ —45% to 50% thru 100 mesh, 61% to 70% thru 50 mesh; bulk.....	2.50
Cape Girardeau, Mo.—Analysis, 90% CaCO ₃ , .04% MgCO ₃ —50% thru 4 mesh.....	1.50
Chicago, Ill.—Analysis, 53.63% CaCO ₃ , 37.51% MgCO ₃ —90% thru 4 mesh.....	1.50
Columbia, Ill., near East St. Louis—½-in. down.....	1.25@1.80
Detroit, Mich.—Analysis, 88% CaCO ₃ , 7% MgCO ₃ —75% thru 200 mesh, 2.50@4.75—60% thru 100 mesh.....	1.80@3.80
Elmhurst, Ill. — Analysis, 35.73% CaCO ₃ , 20.69% MgCO ₃ —50% thru 50 mesh.....	1.25
Greencastle, Ind. — Analysis, 98% CaCO ₃ —50% thru 50 mesh.....	2.00
Lannon, Wis.—Analysis, 54% CaCO ₃ , 44% MgCO ₃ —90% thru 50 mesh.....	2.00
Marblehead, O.—Analysis, 83.54% CaCO ₃ , 14.92% MgCO ₃ —52.4% thru 100 mesh, 59% thru 50 mesh, 100% thru 10 mesh; sacks, 5.25; bulk.....	3.00
Limestone screenings; bulk.....	1.50
McCook, Ill.—Analysis, 54.10% CaCO ₃ , 45.04% MgCO ₃ —100% thru ¼-in. sieve, 78.12% thru No. 10, 53.29% thru No. 20, 38.14% thru No. 30, 34.86% thru No. 50, 22% thru 100 mesh.....	1.50
Milltown, Ind.—Analysis, 91.59% CaCO ₃ , 4.87% MgCO ₃ —24% thru 200 mesh, 33.6% thru 100 mesh, 40% thru 50 mesh, 50% thru 40 mesh, 70% thru 20 mesh.....	1.65
Mitchell, Ind.—50% thru 100 mesh.....	2.00
Montrose, Ia.—90% thru 100 mesh.....	1.25
Ohio (different points), 20% thru 100 mesh; bulk.....	1.50@1.75
Piqua, O. — Analysis, 82.8% CaCO ₃ , 8.2% MgCO ₃ ; neutralizing power in terms of calcium carbonate, 95.3%—50% thru 100 mesh.....	3.50@5.50
50% thru 50 mesh.....	1.75@2.00
Ridgeville, Ind.—Analysis, 98% CaCO ₃ 100% thru 4 mesh.....	1.75
River Rouge, Mich. — Analysis, 54% CaCO ₃ , 40% MgCO ₃ ; bulk.....	.80@1.40
Stolle, Ill., near East St. Louis on I. C. R. R.—Thru ¼-in. mesh—Analysis, 89.61% to 89.91% CaCO ₃ , 3.82% MgCO ₃	2.25
Stone City, Ia.—Analysis, 98% CaCO ₃ —90% thru 50 mesh.....	.60
Toledo, O.—Analysis, 52.72% CaCO ₃ , 43% MgCO ₃ —20% thru 100 mesh, 30% thru 50 mesh, 80% thru 100 mesh, 100% thru 5/32 green.....	1.80
Whitehill, Ill. — Analysis, 97.12% CaCO ₃ , 2.50% MgCO ₃ —90% thru 100 mesh.....	5.00
50% thru 50 mesh.....	2.00

(Continued on next page.)

Agricultural Limestone

(Continued from preceding page.)

Yellow Springs, O.—Analysis, 96.08% CaCO₃, 63% MgCO₃—32% thru 100 mesh, 8% thru 50 mesh, 99% thru 10 mesh; sacks, 8.25; bulk..... 5.25

SOUTHERN:

Blowers, Fla.—Analysis, 98% combined carbonates—75% thru 200 mesh..... 5.00
Cartersville, Ga.—Analysis, 96% combined carbonates—pulverized limestone..... 1.75@2.00

Claremont, Va. (Marltime)—Analysis, 90% CaCO₃, 2% MgCO₃—90% thru 50 mesh; bulk..... 3.50

Dittlinger, Tex.—Analysis, 99.09% CaCO₃, .04% MgCO₃—90% thru 100 mesh..... 2.00@3.00
90% thru 4 mesh..... 1.00@2.00

Grovia, Ga.—Analysis, 95% CaCO₃, no MgCO₃—50% thru 100 mesh..... 2.50
Hopkinsville, Ky.—Analysis, 94.6 to 98.1% CaCO₃; bulk..... 2.00

Knoxville, Tenn.—Pulverized 90% thru 100 mesh..... 2.50
90% thru 50 mesh..... 2.00
1.50

Ladds, Ga.—Pulverized limestone..... 2.50
Linville Falls, N. C.—Analysis, 53% CaCO₃; 42% MgCO₃—50% thru 100 mesh; sacks, 4.50; bulk..... 3.00

Memphis, Tett., Ky.—Analysis, 95.31% CaCO₃, 1.12% MgCO₃; average price. 1/4 in. down..... 2.00

Mascot, Tenn.—Analysis 52% CaCO₃, 38% MgCO₃..... 3.00
80% thru 100 mesh..... 3.00
All thru 10 mesh..... 2.50

80% thru 200 mesh..... 5.00
Paper bags, \$1.50 extra per ton; burlap, \$2.00 extra per ton.

Maxwell, Va. 2.50
Mountville, Va.—Analysis, 76.6% CaCO₃, 22.83% MgCO₃—100% thru 20 mesh; 100 lb. ppr., 7.00; bulk..... 5.00

Ocala, Fla.—Analysis, 98% CaCO₃—75% thru 200 mesh..... 4.50

WESTERN:

Colton, Calif.—Analysis, 95% CaCO₃, 1 1/4% MgCO₃—all to pass 14 mesh; bags 5.00; bulk..... 3.50

Sacks, 15c extra, returnable.
Garnett, Okla.—Analysis, 86% CaCO₃, 50% thru 4 mesh..... .50

Kansas City, Mo., Corrigan Sid'g—50% thru 100 mesh; bulk..... 2.00
Terminus, Calif.—Analysis, 96.2% CaCO₃, .04% MgCO₃—60% thru 200 mesh, 90% thru 100 mesh, 95% thru 50 mesh, 100% thru 4 mesh; sacks, 6.00; bulk..... 5.25

Tulsa, Okla.—90% thru 4 mesh..... .50

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated.

GLASS SAND:

Beach City, O.—Washed and screened..... 3.00
Berkeley Springs, W. Va. 2.50
Cedarville and South Vineland, N. J. 2.00

Cheshire, Mass. 5.00@7.00
Columbus, Ohio 2.50@3.00
Gray Summit, Mo. 2.50@4.00

Hancock, Md.—Damp 2.50@3.50
Klondike and Pacific, Mo. 2.50@3.00
Mapleton, Pa.—Dry 3.50

Glass, damp 2.50
Massillon, Ohio 3.50
Millington, Ill. 1.75

Mineral Ridge, Ohio 3.00
Montoursville, Pa.—Green, washed..... 2.00@2.25
Morgantown, W. Va. 3.00@3.25

Oregon, Ill.—Large contracts..... 2.00@2.25
Ottawa, Ill. 3.00
Pittsburgh, Pa.—Dry, 4.00; damp..... 3.25

Rockwood, Mich. 3.25
St. Marys, Pa.—Green 2.75
Thavers, Pa.—Washed 2.00@2.50

Utica, Ill. 1.75@2.25

FOUNDRY SAND:

Ableman, Wis.—Brass molding and molding fine..... 3.00
Albany, N. Y.—Glass and sand blast..... 2.00@7.00

Core 1.40@2.50
Furnace lining 2.50@3.00
Molding fine, coarse and brass..... 2.00@2.25

Allentown, Pa.—Core 1.50@1.75
Molding coarse 1.50@1.75
Arenzville, Ill.—Molding fine..... 1.50@1.75

Beach City, O.—Core, washed and screened..... 2.00@2.50
Furnace lining 2.50@3.00
Molding fine and coarse..... 2.25@2.50

Bowmantown, Pa.—Core 1.35@1.50
Molding, coarse 1.80@2.00
Cleveland, O.—Molding coarse..... 1.50@2.00

Brass molding 1.50@2.00
Molding fine 1.50@2.25
Core 1.25@1.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, 1/4 inch and less	Gravel, 1/2 inch and less	Gravel, 1 inch and less	Gravel, 1 1/2 inch and less	Gravel, 2 inch and less
EASTERN:						
Attica, N. Y. ....	.75	.75	.75	1.00	1.00	1.00
Erie, Pa. ....	.48	1.00		1.65		1.75
Farmingdale, N. J. ....	.48				1.50	
Hartford, Conn. ....	.90		1.25	1.15	1.15	1.15
Leeds Junction, Me. ....	.60@.75	.75	2.00	1.75	1.65	1.50
Ludlow, Mass. ....	.75	.75	1.70		1.50*	1.50*
Philadelphia, Pa. ....	.75			1.65	1.50	
Pittsburgh, Pa. ....	.75	1.30	1.30	1.30	.85	.85
Portland, Maine ..... .50@.60				1.50		1.35
Texas, Md.	1.00			Pure white sand, 1.50	1.50	
Washington, D. C. ....	.75	.75	2.00	1.40	1.20	1.20

CENTRAL:

Alton, Ill. ....	.85					
Anson, Wis. ....	.50	.50		1.00		.90@1.00
Attica and Covington, Ind. ....	.90	.90	.90	1.00	1.00	1.00
Barton, Wis. ....	.60	.60	.70	.70	.70	.70
Beloit, Wis. ....	.60	.60			.60	
Chicago, Ill.	1.75@2.23	1.75@2.43				
Cincinnati, O., and vicinity.....	.65	.60	.85	.85	.85	.85
Columbus, O. ....	.90	.90@1.25	1.25	.90@1.25	.90@1.25	.90@1.25
Des Moines, Ia. ....	.90	.65	1.60	1.60	1.60	1.60

Detroit, Mich. ....	.65	.65	25% gravel, .90; 50% gravel, 1.15	.95	.95	.95
Earlested (Flint), Mich. ....	.70		60-40 sieves, .85; Pebbles, .95			
Eau Claire, Wis. ....	.50	.50	1.00@1.25	1.00	1.00	
Elgin, Ill. ....	.80	.80	1.00	.80	.80	.80
Elkhart Lake, Wis. ....	.70	.58	.90	.90	.72	.72
Grand Rapids, Mich. ....		.55		.90	.85	.85
Greenville, Mechanicsburg, O. ....	.80	.70	.80	1.00	.85	.80
Hamilton, O. ....		.90			.90	
Hawarden, Ia. ....	.70	.70			1.60	
Indianapolis, Ind. ....	.60	.60		1.50	.75@1.00	.75@1.00
Janesville, Wis. ....	.65@.75				.65@.75	
Le Mars and Doon, Ia. ....		.90		1.80		
Libertyville, Ill. ....	.75	.75		.75	.75	

Lincoln, Neb.		Sand .40, sand and gravel .80, drained for shipment				
Mason City, Ia. ....	.90	.80	1.90	1.80	1.70	1.65
Milwaukee, Wis.	1.30	1.30	1.40	1.40	1.40	1.40
Minneapolis, Minn. ....	.50	.50	1.50	1.50	1.50	1.50
Moline, Ill. ....	.70	.70	1.20	1.20	1.10	1.10
Oxford, Mich. ....		.60		.85	.85	.85
St. Louis, Mo., f. o. b. cars.....	1.60	1.65	1.80	1.60		1.55
Summit Grove, Clinton, Ind. ....	.90	.90	.90	1.00	1.00	1.00
Terre Haute, Ind.	1.00@1.25	1.00	1.25	.90@1.25	.90@1.25	.90@1.25
Winnipeg, Man.	1.90	1.90		3.25		2.85
Winona, Minn. ....	.70	.60	2.00	1.75	1.50	1.25
Yorkville, Morants, Oregon and Sheridan, Ill. ....	.70@.80	.70@.80	.80@.90	.70@.80	.70@.80	.70

SOUTHERN:

Alexandria, La. ....	.60@.90					1.65@1.85
Charleston, W. Va.			Sand 1.40—Gravel 1.50			
Ft. Worth, Tex.	2.00@2.25*	2.00@2.25*	2.75@3.00*	2.75@3.00*	2.75@3.00*	
Greenville, Miss.	1.10	1.10				1.00
Jedburg, Mo.	1.05		1.20	1.00	1.00	.95
Knoxville, Tenn.	1.15	1.15		2.15	1.95	1.75
Lake Weir, Fla. ....	.75					
Macon, Ga. ....	.75@1.00					
Memphis, Tenn.	1.40	1.40	1.50			1.50
N. Martinsville, W. Va.	1.30			1.40		1.00
New Orleans, La.	1.00		1.75		1.25	
Pine Bluff, Ark.	1.25	.92				
Roseland, La.				1.25		
					Washed gravel, all sizes, 2.30	

WESTERN:

Grand Rapids, Wyo. ....	.50	.50	.85	.85	.80	.80
Kansas City, Mo.	(Kaw River sand, car lots, .75 per ton, Missouri River, .85)					
Niles, Calif.	1.00	1.00	1.40	1.00	1.00	1.00
Pueblo, Colo.	1.10*	1.00*			1.50*	
San Francisco, Calif.	1.00	1.00@1.20	.85@1.00	.85@1.00	.85@1.00	.85@1.00
Seattle, Wash.	1.50*	1.50*	2.00*	1.50*		1.50*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, 1/4 inch and less	Gravel, 1/2 inch and less	Gravel, 1 inch and less	Gravel, 1 1/2 inch and less	Gravel, 2 inch and less
Attica, Covington, Silverwood, Ind. and Palestine, Ill. ....	.75	.75	.75	.75	.75	.75
Boonville, N. Y. ....	.60@.80		.55@.75			1.00
Cape Girardeau, Mo.			River sand, 1.00 per yd. .80 per ton—1.20 washed			
Cherokee, Ia.						
Detroit, Mich.	1.10*			1.00		
Dudley, Ky. (Crushed Sand).....		1.05		Washed gravel .66		
Elkhart Lake, Wis.						
Fishers, N. Y. ....	.65@.85	.75@.85				.65@.85
St. Jefferson, Mechanicsburg, O. ....	.70	.60		.60		
Gleenville, N. Y.				1.00*		
Hamilton, O.			6 in. and less, .60 per ton			
Hartford, Conn.	1.00*					
Hersey, Mich. ....	.60	.60	.60			
Indianapolis, Ind.			Mixed gravel for concrete work, .65		.65@.75	
Janesville, Wis. ....	.65					.60
Lindsay, Tex. ....				.65	.65	.65
Oxford, Mich.						
Pine Bluff, Ark.			Road gravel .60			
Roseland, La. ....	.75					
Saginaw, Mich., f. o. b. cars.....	.75	1.30	1.30		1.30	1.30
St. Louis, Mo. ....		.60	.65 gravel, 40% sand 1.70	.65	.65	.65
Summit Grove, Ind. ....	.65	.65				.65
Valde Rouge, La. ....						.85
Waco, Texas ....		.80		1.50		1.30
Yardville, N. J. ....	.50@.75					
York, Pa.	1.10@1.20					

*Cubic yard. B Bank. I. Lake. || Ballast

Crushed Slag

City or shipping point	Roofing	¾ inch down	¾ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Buffalo, N. Y.	2.35	1.25	1.25	1.25	1.25	1.25	1.25
E. Canaan, Conn.	4.00	1.10	2.50	1.35	1.25	1.25	1.25
Eastern Pennsylvania and Northern New Jersey	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Eric, Pa.	2.35	1.25	1.25	1.25	1.25	1.25	1.25
Emporium, Pa.	2.35	1.25	1.25	1.25	1.25	1.25	1.25
Lebanon, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Sharpville and West Middlesex, Pa.	2.00	1.30	1.70	1.30	1.30	1.30	1.30
Western Pennsylvania	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Chicago, Ill.			All sizes, \$1.50, F. O. B. Chicago				
Detroit, Mich.			All sizes, 1.65, F. O. B. Detroit				
Ironton, O.	2.40		other grades 1.75@2.00				
Jackson, O.	2.00	1.35	1.70	1.35	1.35	1.35	1.35
Stuebenville, O.	2.00	1.40	1.70	1.40	1.40	1.40	1.40
Toledo, O.	2.20	1.70	1.95	1.95	1.95	1.70	1.70
Youngstown, Dover, Hubbard, Leetonia, Struthers, Steubenville, Lowellville & Canton, O.	2.00	1.40	1.70	1.30	1.30	1.30	1.30
SOUTHERN:							
Alabama City, Ala.	2.05	.80	1.00@1.25	1.15	1.05@1.10	.85@1.00	.85@.90
Birmingham, Ala.	2.05	.80	1.25	1.15	1.10	.95	.85
Ensley, Ala.	2.05	.80	1.00@1.25	1.15	1.05@1.10	.95@1.00	.85@.90
Longdale, Coshen, Glen Wilton & Low Moor, Va.		2.50	1.00	1.25	1.25	1.15	1.05

Agricultural Lime and Hydrate

	Agricultural Lime—Bulk	Agricultural Lime—Bags	Per Cent CaO	Per Cent MgO	Agricultural Hydrate—Bags
EASTERN:					
Adams, Mass.		8.00	58	0.5	
Bellefonte, Pa.		11.50	98.2	.72	12.00
Berkeley, R. I.			50	18	15.00
Branchton, Pa.		4.50			
Cassadaga, N. Y.—Marl.		10.00	48.07	1.08	
Chippewa, Pa.		6.00	78.67	1.33	
Hot Springs, N. C.		3.00			
Lime Kiln, Md.		8.00			
Lime Ridge, Pa.	6.00@7.50		80.56-62.71	3.87-1.96	10.75
Paxtang and Lemoyne, Pa.		5.50	63	3	
Rockland, Maine		8.00	65	1	
Rosendale, N. Y.		7.00	84	7	6.00
Union Bridge, Md.		11.00	73	1	13.00
Williamsport, Pa.		6.00	75	3	10.00
West Rutland, Vt.		4.50	68	3	
West Stockbridge, Mass.					15.00
Williams and Blue Bell, Pa.		8.25	57	33	11.25
York, Pa.		8.50	95	3	12.00
CENTRAL:					
Alton and Hannibal, Ill.		11.50	95		
Delaware, O.			50.0	5-12	10.00
Knowles and Valders, Wis.		5.00	55	45	12.50
Marblehead, O.			85.10	12.92	12.00
Mitchell, Ind.					12.50
Sheboygan, Wis.		5.50	58	40.5	
Woodville, Ohio		8.50	49.16	32.43	11.50
SOUTHERN:					
Burns, Tenn.		9.50	96	0.54	12.00
Claremont, Va. (Marl.)		5.00	85.95	2.5	
Erin, Tenn.		7.50@10.00	97.82	0.12	
Karo, Va.		8.50	97	1.25	
Knoxville, Tenn.		9.00	98.23		13.00
Staunton, Va.		8.00	85	10	
WESTERN:					
Colton, Calif.			97	2	15.00
Kirtland, N. Mex.		12.00			
San Francisco, Calif.			98-99	5.75	19.50
Tehachapi, Cal.		12.00@15.00	98	1.00	

Miscellaneous Sands

(Continued from preceding page)

Columbus, O.—Core	.60@2.50	Brass molding	2.25
Brass molding	2.50	Core	1.50@2.25
Sand blast	5.00@5.50	Molding fine	2.25
Glass sand	3.00	Molding coarse	2.00
Molding, fine and coarse	2.00@2.25	Sand blast	5.00
Connecticut, O.—Molding fine	2.25@2.50	Greenville, Ill.—Molding coarse	1.60@1.80
Molding coarse	2.00@2.25	Howard, O.—Glass sand	3.00@3.25
Delaware, N. J.—Molding fine	2.00	Steel molding	2.25@2.50
Molding coarse	1.00	Ioplin, Mo.—Stone sawing and roofing	1.25
Brass Molding	2.15	Kansas City, Mo.—Missouri River core	.80
Dresden, O.—Core	1.50	Kasota, Minn.—Molding coarse and stone sawing	1.65
Molding fine and coarse	1.50@1.75	Klondike and Gray Summit, Mo.—Molding fine	2.00@2.50
Brass molding	2.50	Molding coarse	2.50@3.00
Dunbar, Pa.—Glass sand No. 2, damp	3.00	Mapleton, Pa.—Core, furnace lining, molding coarse and brass molding	2.00
Traction, damp	2.85	Molding fine	2.25
Dundee and Chalfants, O.—Sand blast	3.00	Roofing sand	2.00@3.00
Glass, core and traction	2.75	Sand blast	1.50@2.00
Molding fine and brass molding	2.25	Massillon, O.—Glass sand, molding fine and coarse, core, traction and furnace lining	3.00
Furnace lining	2.50	Michigan City, Ind.—Core, glass, traction and brass molding	.60
Molding coarse	2.00	Millington, Ill.—Glass, core, furnace lining, roofing and stone sawing	1.75
Eau Claire, Wis.—Core	.75@1.25	Mineral Ridge, O.—Core, molding, sand blast, roofing, etc., washed, screened (damp)	2.25
Sand blast	3.00@4.25	Montoursville, Pa.—Core and traction	1.00@1.50
Traction sand	.50	Brass molding	1.25@2.00
Falls Creek, Pa.—Glass sand, washed	2.50	New Lexington, O.—Molding fine	2.25
Core sand, washed or unwashed	2.00	Molding coarse	2.00
Furnace lining, unwashed	2.00	Sand blast	3.00
Molding fine, washed	2.00	Glass, core and traction	2.75
Molding coarse, washed or unwashed	2.50	Furnace lining	2.50
Sand blast, washed	3.50		
Stone sawing, washed	2.50		
Traction, washed	2.00		
Fleetwood, Pa.—Furnace lining	2.25		
Franklin, Pa. and Utica, Pa.—Traction	2.50		

Miscellaneous Sands

(Continued)

Brass molding	2.25
Oregon, Ill.—Core and glass sand	2.00
Furnace lining	2.00
Molding fine and coarse	1.00
Sand blast	3.50
Stone sawing	2.00
Ottawa, Ill.—Crude silica sand	1.00@1.25
Core, molding, fine and coarse	1.10@2.25
Furnace lining	1.25@2.00
Roofing and traction	2.00
Sand blast and stone sawing	4.00@5.00
Ottawa, Minn.—Core	2.00@2.50
Glass, molding coarse, roofing, stone sawing (all crude silica)	1.25
Ridgeway, Pa.—Glass sand, green	2.25
Glass sand, wash	2.50
Molding, fine and coarse	1.20
Rockwood, Mich.—Core	2.75@3.25
Roofing	3.25@3.50
Sand blast	4.00
Round Top, Md.—Glass sand, core and roofing sand; washed, damp	1.75@2.25
San Francisco, Cal.—Glass and roofing	3.00@3.50
Core, molding fine and brass	2.30@2.60
Furnace lining and molding coarse	3.60@4.25
Coarse core sand	3.60@4.25
Sand blast	2.30@3.60
Stone sawing and traction	2.30
Thayer, Pa.—Traction	1.50@1.75
Furnace lining	1.10
Molding fine and coarse	1.10
Core, green	1.75@2.00
Tulsa, Okla.—Sand blast	6.50
Utica, Ill.—Core and furnace lining	1.00@1.25
Molding, fine and coarse	1.00
Stone sawing and roofing	1.25
Sand blast	3.50@4.50
Traction	1.75
Warwick, Ohio—Core, furnace lining, molding fine and coarse (dry)	2.50
Same, green	2.25
Wedron, Ill.—Core (crude silica)	1.00@1.25
Molding fine and coarse	1.00@1.25
Furnace lining	1.25
West Albany, N. Y.—Molding fine	2.25
Molding coarse	2.25
Winnipeg, Man., Can.—Roofing sand	4.00
Zanesville, Ohio—Molding fine and brass	1.75@2.25
Molding coarse	1.65@2.00
Furnace lining	2.50@2.75
Glass, core and traction	2.75
Sand blast	3.00
Steel molding	2.50
Pulverized silica thru 140 mesh	8.50
Thru 200 mesh	9.50

Crushed Gypsum

Akron, N. Y.	3.50
Blue Rapids, Kan.	3.50
Castalia, O.	3.50
Ft. Dodge, Ia.	3.50@4.00
Grand Rapids, Mich.	3.50
Gypsumville, Man., Can.	3.50
Oakfield, N. Y.	4.00
Gypsum, O.	3.50
Port Clinton, O.	4.50
Rapid City, S. Dak.	5.00
Saltville, Va.	4.30
Winnipeg, Man., Can.	5.00

(Gypsum) Land Plaster

Akron, N. Y.	4.50
Blue Rapids, Kan.	4.50
Castalia, O.	6.00
Bags extra—Jute 3.00; ppr., 1.00.	
Ft. Dodge, Ia.	4.50
Garhutt, N. Y.—Bags extra	7.50
Grand Rapids, Mich.	4.50@7.50
Gypsum, O.	7.40@8.00
Mound House, Nev.	4.50
Sacks, 25 extra	
Oakfield, N. Y.	7.50
Los Angeles, Calif.	12.50

Rock Phosphate

Raw Rock

Per 2240-lb. Ton	
Centerville, Tenn.—B.P.L. 72% to 75%	6.00@8.50
B.P.L. 65%	8.00
Gordonsburg, Tenn.—B.P.L. 68%	6.00@7.00
B.P.L. 70%	7.50@8.00
B.P.L. 72%	8.50@9.00
Mt. Pleasant, Tenn.—B.P.L. 75%	8.00@9.00
Paris, Idaho—2,000 lb. mine run, B.P.L. 70%	4.50
Wales, Tenn.—B.P.L. 70%	7.75

Ground Rock

Per 2000-lb. Ton	
Centerville, Tenn.—B.P.L. 70%—90% thru 100 mesh	9.00@10.00
B.P.L. 75% (brown rock)	12.00
Mt. Pleasant, Tenn.—B.P.L. 68%—13% Phosphorus	7.50@9.00
14% Phosphorus	8.00
B.P.L. 65@70%	7.00@9.00
Norwills, Fla.—(Fla. Hard Rock)—B.P.L. 68%	10.00

Florida Soft Phosphate

Raw Land Pebble
Per Ton

Bartow and Norwills, Fla.—B.P.L.	6.00@ 8.00
50%, bulk	13.50
B.P.L. 78%, bulk	10.00@12.00
Jacksonville (Fla.) District	

Ground Land Pebble

Per Ton

Jacksonville (Fla.) District	14.00
Add 2.50 for sacks	
Morristown, Fla.—26% phos. acid	16.00
Lakeland, Fla.—B.P.L. 72%	13.50
B.P.L. 60%	6.00

Portland Cement

Current prices per barrel in carload

lots, f. o. b. cars, without bags:	
New York (del.)	\$2.80
New York, alongside dock, to dealers	2.40
Jersey City (del.)	2.89
Boston	2.86
Chicago	2.17
Pittsburgh	2.17
Cleveland	2.43
Detroit	2.43
Indianapolis	2.49
Toledo	2.39
Milwaukee	2.10
Duluth	2.45
Peoria	2.51
Cedar Rapids	2.20
Davenport	3.09
St. Louis	3.36
San Francisco	2.41
New Orleans	3.10
Minneapolis	3.10
Denver	2.60
Seattle	2.75
Dallas	2.57
Atlanta	3.21
Cincinnati	3.21
Los Angeles	3.05
Baltimore (del.) drayload lots	3.20
Birmingham	3.44
Kansas City	3.36
Montreal	
Winnipeg	

NOTE—Bag charge is generally 10c each.

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Bound Brook, N. J.—Trap rock, carload lots: bulk		2.30
Deerfield, Md.—Green; bulk	7.00	7.00
Easton, Pa.—Green Marble, loose in cars	14.00	12.00
Lincoln, Neb.—Red, white, grey, in bags		30.00
Middlebrook, Mo.—Red granite; sacks	30.00@35.00	20.00@25.00
Missouri river points—Different colors	20.00@25.00	20.00@25.00
Piqua, O.—Marble	8.00@10.00	8.00@10.00
Tuckahoe, N. Y.—White Marble	12.00	12.00
Crushed white stone and marble dust in 100 lb. bags	8.50@12.00	
Tate, Ga.—White limestone, sacks extra	6.00@ 7.00	6.00@ 7.00
Wausau, Wis.	14.00@18.00	
Wisconsin and S. Dak. points—Granite, different colors, bulk or sacks	1.50@ 2.00	3.00@ 7.00
Granite dust in bags	6.00	

Sand-Lime Brick

Prices given per 1,000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Albany, Ga.	13.00@14.00
Barton, Wis.	14.00
Brighton, N. Y.	19.50
Buffalo, N. Y.	16.50
El Paso, Texas	14.00
Gary, Ind.	11.50@12.00
Grand Rapids, Mich.	15.00
Lancaster, N. Y.	16.50
Michigan City, Ind.	17.50
Milwaukee, Wis. (delivered at job)	13.00
Minneapolis, Minn.	15.00@25.00
Portage, Wis.—Common	35.00
Face	15.00
Redfield, Mass.	14.75
Saginaw, Mich.	18.00
San Antonio, Texas—Common	25.00
Face	16.50
South Dayton, Ohio	

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Gray Roofing Slate, f.o.b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12	\$ 9.30	\$8.40	\$8.10	\$8.10
24x14	10.72	8.70	8.77	9.10
22x12	10.72	8.70	8.77	9.10
22x11	10.72	8.70	8.77	9.10
20x12	11.70	9.60	9.42	9.42
20x10	11.70	9.60	9.42	9.42
18x10	11.70	9.60	9.42	9.42
18x 9	11.70	9.60	9.42	9.42
16x10	11.70	9.60	9.42	9.42
16x 9	11.70	9.60	9.42	9.42
18x 8	11.05	9.30	9.10	9.10
16x12	11.05	9.30	9.10	9.10
14x10	11.05	9.30	8.77	8.77
14x 8	11.05	9.30	8.77	8.77
14x7 to 12x6	10.40	9.00	8.45	
24x12	\$ 8.10	\$7.50	\$7.50	\$5.75
22x11	9.10	7.75	7.75	5.75
Other sizes	9.10	8.10	8.45	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

Syracuse, N. Y. (delivered at job)	20.00
F. o. b. cars, plant	16.00
Toronto, Can.	17.00
Washington, D. C.	14.50
Winnipeg, Can. (less \$1 trade disc.)	19.00

The following are the prices per square for slate, f.o.b. cars quarries, Granville, N. Y., the prices given in each case being for No. 1 Sea Green Roofing Slate:

22x11, 20x12, 20x11, 20x10, 18x12, 18x10,	
18x9, 16x12, 16x10	10.20
24x12, 22x12, 16x9, 16x8, 14x12, 14x10	9.90
26x14, 24x14, 22x14, 20x14	9.60
14x9, 14x8, 12x10	9.00
14x7, 12x9, 12x8	8.70
12x7, 11x8, 11x7, 10x8	7.50
12x6, 10x7	7.20

Granulated slate per net ton, f. o. b. quarries, Vermont and New York, 7.50.

Lime

Warehouse prices, carload lots at principal cities.

	Hydrate per Ton	
	Finishing	Common
New York	\$21.00	\$20.00
Chicago	20.00	
St. Louis	26.00	20.00
Boston	27.25	22.75
Dallas	27.50	25.00
Cincinnati	17.60	16.60
San Francisco	25.40	22.00
Minneapolis	29.00 (white)	22.00
Denver (bbl.)	32.00	
Detroit	22.00	19.00
Seattle	24.00	
Los Angeles	30.00	30.00
Baltimore	22.25	17.50
Montreal	30.00	
Atlanta	22.50	15.00
New Orleans		22.50
Winnipeg		21.20

	Lumper 200-lb. Barrel	
	Finishing	Common
New York	\$ 3.50 at plant	\$ 3.30*
Chicago		1.65
St. Louis		2.50*
Boston	3.65	3.40
Dallas		2.50†
Cincinnati		13.10†
San Francisco		2.25
Minneapolis	2.00	1.70
Denver	1.00 (bu.)	3.20
Detroit	2.00†	1.80†
Seattle	3.25	2.75
Los Angeles	3.00*	3.00*
Baltimore		12.75†
Montreal	15.00†	
Atlanta		1.25
New Orleans		2.25
Winnipeg	3.20	13.80†

Natural Cement

Current price for 500 bbl. or over, f.o.b., exclusive of bags:

Minneapolis (Rosendale)	\$2.80
Kansas City (Ft. Scott)	1.60
New Orleans	3.36
Atlanta (Magnolia)—ton	11.00
Boston (Rosendale)	2.35
Cincinnati (Louisville)	2.75

* 300-lb. barrels. † Per 180-lb. barrel. ‡ Per ton.
NOTE—Refund of 10c per barrel.

Talc

Prices given are per ton f. o. b. (in carload lots only) producing plant, or nearest shipping point.

Baltimore, Md.—Crude talc	4.00
Cubes, per lb.	50.00
Blanks, per lb.	.08
Chatsworth, Ga.—Crude talc	8.00@10.00
Ground talc (150-200 mesh), bags	12.50
Pencils and steel workers' crayons, per gross	1.50@ 2.00
Chester, Vt.—Ground talc (150-200 mesh), bulk, 10.50@12.00; bags	12.00@14.00
Emeryville, N. Y.—Crude Talc	4.00
Glendale, Calif.—Ground talc (150-200-mesh)	16.00@30.00
(Bags extra)	
Gouverneur, N. Y.—Crude talc	4.00
Ground talc (150-300 mesh)	17.00@24.00
Henry, Va.—Crude talc (lump mine run), per 2000-lb. ton	2.75@ 3.25
Ground talc (20-50 mesh), bags, 7:50; bulk	6.25
Ground talc (150-350 mesh), bags	11.25@13.50
Johnson, Vt.—Ground talc (20-50 mesh), bulk	8.50
(Bags extra)	
Ground talc (150-200 mesh), bulk	10.00@20.00
Keeler, Calif.—Ground talc (200-300 mesh), bags	18.75@32.00
(Bags extra)	
Los Angeles, Calif.—Ground talc (20-50 mesh) 200-lb. bags	12.00
Ground talc (150-200 mesh) 200-lb. bags	20.00
Natural Bridge, N. Y.—Ground talc (150-200 mesh) bags	12.00@18.00
Rochester and East Granville, Vt.—Ground talc (20-50 mesh), bulk	8.50@10.00
(Bags extra)	
Ground talc (150-200 mesh), bulk	10.00@22.00
(Bags extra)	
Vermont—Ground talc (20-50 mesh); bags	8.50@10.00
Ground talc (150-200 mesh); bags	9.00@16.00
Waterbury, Vt.—Ground talc (20-50 mesh), bulk	8.50
(Bags extra)	
Ground talc (150-200 mesh), bulk, 10@15.00 and	10.00@15.00
(Bags extra)	
Pencils and steel workers' crayons, per gross	1.20@ 2.00

Concrete Brick

Prices given per 1,000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Bellow Falls, Vt.	20.00	35.00
Bridgeport, Conn.	31.00	32.00
Buffalo, Niagara Falls and Rochester, N. Y.	21.00	
Eau Claire, Wis.	20.00	30.00@40.00
Houston, Tex.		22.00
Lockport, N. Y.	17.00	
Milwaukee, Wis.	17.00@18.00	35.00@65.00
Omaha, Neb.	32.00	42.00
Piqua, O.	18.00	25.00
Portland, Ore.	25.00	43.00@73.00
Fancy brick	100.00@150.00	
St. Paul, Minn.	18.00	32.00
Springfield, Ill.	18.00	20.00@25.00
Tonawanda, N. Y.	20.00	



General Market News



What the National Agricultural Limestone Association Is Doing for the Industry

AT A RECENT MEETING of the National Agricultural Limestone Association the secretary, A. P. Sandles, made a report in which, among other things, it was stated:

"Freight rates have been a handicap on 'agstone' movement. A conference has been arranged to meet President Harding at the White House this Friday forenoon. [This took place April 29.—Editor.] An invitation came for me to be present. It seems to me that the entire stone industry, including agstone, would be greatly benefitted if we could get the President's help in hastening reduction of freight rates, which many county agents have said kept farmers from buying and using agricultural limestone.

"Many letters have gone from our office to county agents. Replies thereto indicate that agstone is on the program of county farm bureaus and county agents in all sections of the country. We are sending letters to county agents in Ohio, Indiana, Michigan, Kentucky, West Virginia, Western Pennsylvania, Western New York, Illinois and Missouri. We have helped to arouse great interest in Indiana. We have suggested to these agents that grain elevators, coal dealers and farmers' co-operative societies should be urged to handle and keep in stock agstone at all times of the year to enable farmers to buy in less than carload lots. We suggested that county agents and farm bureau officials urge local farm implement dealers to handle agstone spreaders and mention same in all their advertising, and also exhibit same at county fairs.

"Agstone must be sold at a price that will give producer reasonable profit on his investment and cost of production. It must be sold at a price that will give a fair profit to local dealers who handle same. If this profit is sufficient, we will enlist an army of local boosters as agstone salesmen. Boosting agstone and agstone spreaders must go hand in hand.

"Every agstone producer should read our announcement on the back cover page of April issue, 'Macadam Service.' Two acres, same soil, side by side. On one acre—two tons of agstone. On the other—none. Note four-year rotation of crop results. The Ohio Experiment Station has given a message that ought to make every agstone producer have utmost faith in this industry. Stripped of

all camouflage propaganda or exaggeration of any kind, this experiment shows that agstone at \$10 per ton would still be one of the best investments the farmer can possibly make. Yet no agstone producer dreams of any such price.

"The cornerstone of our whole game is a sane business vision. We must see and realize that agstone cannot always remain in the pioneer zone. Agstone producers must commence to realize a profit from their product. This profit will come if agstone producers will sell to themselves the big agstone idea. So long as we talk \$3 a ton, those who buy will talk \$2.50 or \$2.75.

"We have established friendly and co-operative relations with experiment stations, agricultural colleges, extension workers, farm bureaus and others. No one can measure the true value of this particular part of the game. These officials and public servants look upon our Association and deal with us in confidence, not with any tinge of distrust or suspicion.

"Mr. Wagner's work has been a potent factor in establishing these friendly relations. You should consider carefully and outline his work and decide whether he shall pursue past policy and promote and create demand for agstone through rural communities or spend more time in securing new members and thoroughly convert our old members to a sane policy of association and co-operative work."

Protest Proposed Seasonal Coal Rates

A. J. SULLIVAN, treasurer of the Illinois Crushed Stone Association (and of the National Crushed Stone Association also), recently sent the following letter to Illinois senators and congressmen:

"I am informed that the Hon. Joseph S. Frelinghuysen has introduced in the Senate a Bill authorizing and directing the Interstate Commerce Commission to reduce railroad rates on coal during the coming spring and summer months.

"The passage of that Bill would have the proximate effect of causing the loss of millions of dollars, not only to the home building industry but to the road-making developments of the entire country as well, on account of the inevitable shortage of open-top cars during the building season, as a direct result of the proposed preferential rates on coal.

"All through the year 1920, due to priority order in favor of coal producers, building and road-making enterprises were so seriously affected by car short-

age that it was almost impossible to make shipments of building material, the consequence being that practically no buildings were erected and few new highways were constructed, and the country is now confronted with the condition that tens of thousands of people are unable to find homes in which to live, and farmers are handicapped in bringing their products to the markets on account of probably inadequate roadways or highways, all this resulting in reducing building operations to a minimum and increasing cost of operation and construction to a maximum.

"Notwithstanding the priority privileges extended to coal operators for the unrestricted right to the use of open-top cars all through the year 1920; and while production was normal, the price of coal advanced from 100 per cent to 300 per cent. Meanwhile, consumers were stampeded into purchasing their winter supply of coal on a rising market only to find that late in the fall, after the public had stored its coal for the succeeding months, a sharp drop occurred in price and demand decreased to such an extent that coal transportation had practically ceased, leaving the railroads with myriads of open-top cars lying idle in the yards and switch tracks.

"In view of the foregoing facts and circumstances the association for which I speak most respectfully urges that, for the good and welfare of transportation companies, material men, contractors and the general public, freight rates on building and road-making materials, as well as on coal, be reduced at the earliest possible date to a proper and lower level and the reduction to remain in effect for a period of not less than two years. This would be nothing more than common justice. Besides it would stimulate the building and road-making industries and all would be benefited. The railroads would enjoy an era of real, old-time prosperity, employment would be thrown open to millions of men who at present are face to face with a period of industrial inactivity; farmers would be enabled to haul their products to market and rail heads; housing conditions would be relieved, and rents would be standardized.

"This is a matter of vital importance to all industries and all classes, as it would insofar as car supply is concerned place all producers and shippers of basic materials and supplies upon an equal footing."

According to various reports there is not much chance that the coal men will succeed in putting this bill across.—Editor.



News of the Industry



Incorporations

The Frontenac-Abudell Mines Co., Boston, Mass., has been incorporated for \$1,750,000.

The Concrete Roofing Tile Co., 361 Madison Street, Passaic, N. J., has been incorporated for \$100,000.

The Sand and Gravel Corp., 538 Guarantee Trust Building, Atlantic City, N. J., has been incorporated for \$100,000.

The Wenatchee Concrete Pipe Co., Wenatchee, Wash., has been incorporated for \$30,000 by John Roberts and Christian Bullen.

The Forest Hills Material Co., Elmhurst, N. Y., has been incorporated for \$5,000 by G. C. and J. E. Meyer and R. W. Kellogg.

The Grant Park Gravel Co., Cedarhurst, N. Y., has been incorporated for \$15,000 by P. Haller, W. L. Belcher and C. Kurzenhauser.

The Double Strength Concrete Block Co., Tulsa, Okla., has been incorporated for \$10,000 by L. L. Mixon, G. A. Cairn and Everett Petry.

The Pacific Gravel Co., San Francisco, Cal., has been incorporated for \$5,000 by D. C. Buckley, L. Rosenwein and G. W. Schonfeld.

The Kelley & Tennant Co., 41 Herish Building, Elizabeth, N. J., has been incorporated for \$100,000 to engage in mining and quarrying.

The Platteville Cement Products Co., Platteville, Wis., has been incorporated for \$5,000 by Wilson Cunningham, W. B. Hall and Theo. A. Waech.

The H. E. Stratton Pulp Stone Co., Toronto, Ohio, has been incorporated for \$50,000 by H. E. D. S., G. W., A. Liona, and Eula E. Stratton.

The Fairport Clay and Sand Products Co., Philadelphia, Pa., has been incorporated for \$40,000 by E. B. Reed, H. J. Maguire and J. F. Carroll of Overbrook, Pa.

The Hudson Cement Products Corp., White Plains, N. Y., has been incorporated for \$200,000 by A. D'Elia, 29 Main Street, to deal in building materials of all kinds.

The Piedmont Mineral Co., Roanoke, Va., has been incorporated for \$24,000 by H. B. Gregory, president; T. L. Fellers, director, and W. V. Birchfield, secretary.

The Robinson Lime Co., Winchester, Tenn., has been incorporated for \$250,000 by A. J. Robinson, Arthur Crownover, W. S. Claiborne, C. C. Ferriss and Mary H. Bates.

The Kopf Concrete Co., Fond du Lac, Wis., has been incorporated for \$5,000 by Jos. Clarence A. and Bertha H. Kopf. The company will manufacture concrete products.

The Nu-Wood Corp., Milwaukee, Wis., has been incorporated for \$50,000 by Henry Dorn, F. W. Dorn and E. T. Hindman. The company will deal in all kinds of building materials.

The Heriot Lime Co., Birmingham, Ala., has been incorporated for \$5,000. The officers of the company are: W. B. Heriot, president, and J. S. Bailey, vice-president and treasurer.

The Illinois-Wisconsin Tile and Pipe Co., Beloit, Wis., has been incorporated for \$50,000 to manufacture concrete tile and sewer pipe in connection with the Atwood-Davis sand pits in Beloit.

The National Soap Stone Co., Roanoke, Va., has been incorporated for \$200,000 by W. G. Jones, president; F. L. Gitt, secretary, and L. H. Patterson. The company will quarry soapstone and talc.

The Capital Stone Co., Columbus, Ohio, has been incorporated for \$100,000 by W. H. Francis, J. R. Francis, W. E. Anderson, Frances C. Staudt, and Grace M. Jones to quarry and crush stone.

The Edward A. Gorman Co., Dayton, Ohio, has been incorporated for \$20,000 by Edward A. Gorman, Emma V. Gorman and John F. Glaser. The company will deal in building materials of all kinds.

The Camden Road Material Co., Camden, Tenn., has been incorporated for \$75,000 by S. M. Neely, president; W. P. Murphy, vice-president, and G. W. Vooshe, secretary and manager. The company will operate a sand and gravel plant.

The Lampe Construction and Trading Co., Vermillion, Ohio, has been incorporated for \$25,000 by C. F. Elwood, E. C. Lampe, F. N. Lang, Frank Schoener and J. H. Barry. The company will produce and sell sand, gravel and crushed stone.

Quarries

The Vermont Marble Co.'s quarry at Token, Alaska, is operating the same as usual this season with a force of about 50 men.

The Bee Rock Quarry, Searcy, Ark., started operating recently and crushed stone is being shipped by barges to different points on the Mississippi River.

The crushing plant near Alpine, Tex., has been completed and is now in operation, furnishing crushed rock for ballast work on the Southern Pacific Railroad between El Paso and Del Rio.

The Cowell Lime and Cement Co., Cowell, Calif., will open new stone quarries on its Mt. Diablo property. A mile of railroad track costing \$25,000 will be built according to W. H. George, manager of the company.

The New Jamestown Quarry Co., St. Louis Mo., has been recently organized by the farmers in the county. The company plans to install equipment to turn out crushed stone for road work and agricultural limestone.

The Ingalls Stone Co., Bedford, Ind., has started operations in its new stone-cutting mill which was recently completed. This mill has been under construction for the past two years and cost about \$500,000. It is a large building 100x400 ft., of steel construction.

The Champlain Green Granite Co., Au Sable Forks, N. Y., has been formally transferred to George Bros., of Dixon, Ill. The quarry has been in operation for some time turning out granite for monumental purposes. The new owners are contemplating the installation of a crushing plant for taking care of the waste stone accumulation.

The Uvalde Rock Asphalt Co., Beaumont, Tex., is now doing a capacity business, according to J. B. Smythe, president of the company. Mr. Smythe stated that the company was now shipping 25 cars a day and it was thought that this could be increased to 30 cars. This is contingent upon the present machinery being brought up to a stage of efficiency where it will handle that much. It is not unlikely that the company will make some extensive improvements in that respect at an early date. This material is being used in different sections of Texas.

Sand and Gravel

Gerhardt Monninger, of Terre Haute, Ind., will start a retail sand and gravel business according to a recent announcement. He will also do concrete construction work.

The Artcraft Roofing Co., Louisville, Ky., has changed its name to the "Security Artcraft Roofing Co." and increased its capitalization from \$3,000 to \$6,000. The incorporators are: L. M. Rice, Jr.; Fred Von Siebenthal, J. R. Rice, and A. M. Marrel, all of Louisville.

The Midland Gravel Co., Millbrook, Mich., has employed the services of the engineering department of the Greenville Gravel Co., Greenville, O., to design and install its 1000-yard sand and gravel washing plant. The installation includes a large crushing plant, ground storage facilities and a ten-ton loading hopper.

The Southern Sand & Gravel Co., Columbus, Ohio, will dredge the Scioto River from the old State Dam to Greenlawn Avenue in Columbus, a distance of about one-half mile. The company will market the sand and gravel obtained by this dredging operation. A dredge is now at work digging a channel for the barges which will be used to bring the sand and gravel to the bank. A large crane has been erected to lift the material from barges to the plant at McDowell Street. Construction of the plant will be completed early this month, according to David Broadfoot, superintendent of the works.

Concrete Products

The Middleton Cement Products Co., Middleton, N. S. Can., will erect an addition to its plant.

Abram O. Johnson, Monmouth Beach, N. J., proposes installing a concrete block plant of about 900 blocks daily capacity.

J. J. Kelly is about to establish a plant in Fort Lauderdale, Fla., to manufacture concrete building blocks, ornamental tile, cornices, etc.

The Williamson Concrete Co., Red Oak, Iowa., has begun the erection of an office and machinery storage building on the corner of First and Market Streets.

W. A. Patton and associates, Catlettsburg, Ky., are perfecting plans for the establishment of a new plant for the manufacture of concrete blocks and tile. Operations will be inaugurated at an early date.

The Union Sand & Manufacturing Co., of Fort Worth, Tex., is reported about to begin the construction of a plant for the manufacture of concrete structural units, and will open its sand and gravel pit east of Riverside.

The Newburgh Cast Stone Co., Newburgh, N. Y., has been formed by David Metrusty and Roy P. Curtis and will manufacture concrete blocks. The company owns a 20-acre tract of land containing valuable sand and gravel deposits.

Cement

The Tidewater Cement plant located at Union Bridge, Md., is operating at about 85 per cent capacity.

St. Louis, Chicago and Philadelphia capitalists are contemplating the establishment of a large cement manufacturing plant in Nashville, Ark.

Robert Keil, Sr., and William Weuss have opened a cement and plaster plant in Freeport, N. Y., and will do a general concrete product business.

The Security Cement & Lime Co., Hagerstown, Md., have recently installed two additional 42-in. Fuller Mills in their raw grinding department. This standardizes the equipment for grinding raw material.

The Southwestern Portland Cement Co., Los Angeles, Cal., has been awarded the contract for furnishing the cement for the new warehouse to be erected by the United States Government at San Diego, Cal.

The Gulf Portland Cement Association, Castroville, Tex., recently organized with a capital of \$300,000, is planning for the construction of a large cement manufacturing plant. The company is headed by John J. Shorp and L. C. Ihnken, both of Castroville.

The Bessemer Limestone and Cement Co., Youngstown, Ohio, has been producing cement in its new plant at full capacity for the last month. The output of the plant has been sold ahead for about four months. The rated capacity of the plant is 3,000 bbls. per day. Buying of crushed stone for roadwork is showing improvement, but the sale of flux stone is very low.

Lime

The Peerless White Lime Co.'s plant at Ste. Genevieve, Mo., was destroyed by fire on May 7. The fire was discovered in the sheds adjoining the kilns and spread rapidly, burning all the woodwork surrounding the kilns, the hydrated lime plant, 2,000 barrels and a quantity of sacked lime. The damage is estimated at about \$50,000. Hunkins-Willis Lime and Cement Co. owned the plant.

Slag

The New England Slag Co., East Canaan, Conn., has taken bids for the construction of a new bridge and trestle at its plant, to facilitate the handling of shipments. Construction will be commenced at an early date.

Personals

J. J. Carty, formerly superintendent of the Goose Creek Lime Works, Inc., has been appointed treasurer of the same company in place of R. J. Lake whose resignation became effective May 1.

O. L. Moore, Chief Cement Inspector Universal Portland Cement Co., has been appointed engineer of the Inspection Bureau with headquarters at Chicago, to have charge of all matters pertaining to cement inspection.

C. H. Hartman, secretary of the Valve Bag Co. of America, Toledo, Ohio, is just recovering from

a serious operation for appendicitis. Mr. Hartman is now back on the job and, as he says, is "feeling much better since the operation than I have in months." The trade will join ROCK PRODUCTS in wishing Mr. Hartman good speed and a lasting recovery.

Leslie H. Allen, who has recently been with Fred T. Ley & Co., contractors of Springfield, Mass., has joined the staff of the Portland Cement Association, 111 West Washington Street, Chicago, as assistant manager of the Cement Products Bureau. Prior to joining the Ley organization, Mr. Allen was for 12 years with the Aberthaw Construction Co., of Boston.

Lawrence Lyons, of Brook, Ind., has been appointed director of the Indiana State Highway Department at a salary of \$6,000 a year. Mr. Lyons is now head of the biggest department from point of money handled and the amount of work undertaken, and he is to have full power as director of the department. The plan to have a vice-director for the department has been temporarily abandoned.

L. H. Wright, director of the Indiana State Highway Commission, has announced that he will submit his resignation to the next meeting of the commission to be held some time in May. The announcement was made following a recent meeting of the commission as organized by Governor McCray. Mr. Wright is well known to the sand and gravel industry of the state. He has served as director of the highway department since 1919. Under his supervision the state system of approximately 3,600 miles of roads has been laid out and officially taken over by the state. He was selected by the commission with the approval of the governor for an indefinite term.

OBITUARY

James A. Buckley, pioneer sand and gravel man of Chicago, died recently at his home, 842 West Garfield Boulevard. He was 60 years old. He had lived in Chicago half a century. He is survived by a widow.

W. J. Woodland, quarry contractor, was killed recently by a dynamite explosion at a quarry near Cardinal, Ont. Mr. Woodland was engaged in setting off four blasts. The first one failed to explode until Mr. Woodland approached.

Thomas L. Smith, founder, director and chief stockholder of the T. L. Smith Co., Milwaukee, Wis., died Friday, April 29, 1921, at his home in Milwaukee. Although Mr. Smith brought out a number of successful inventions during his life, he is probably best known to the world as the inventor and manufacturer of the line of Smith Tilting Mixers. Some more of his activities consisted of designing and producing mixers, pavers, excavators, crushers, etc.

Preston K. Yates, consulting engineer, New York City, died in Albany, N. Y., April 22. He was born in Canajoharie, N. Y., in 1856, and was graduated from Rensselaer Polytechnic Institute in 1880. He was for many years associated with Alfred P. Boller on the construction of some of the important bridges in New York City and vicinity. From 1896 to 1900 he had charge of some of the large contracts on the metropolitan water-supply and sewerage systems in Massachusetts.

He was for four years manager of a large Cleveland contracting firm engaged in building docks, breakwaters, dredging, etc. He had for a number of years specialized in the design and construction of crushed stone and gravel plants.

Retail Dealers

The Woodson & Kratch Monument Co., of Louisville, Ky., will erect a monument factory 215x80 ft., at a cost of \$16,000.

The National Building Supply Co., Baltimore, Md., is arranging for the early removal of its plant to its new yards on the Philadelphia, Baltimore & Washington Railroad, in the vicinity of Franklin Street. The company has erected a number of buildings, forming a model plant. Fine storage and handling facilities are provided for cement, in which the company is a large dealer. Other buildings will be constructed at an early date.

Manufacturers

The Orton and Steinbrenner Co., Chicago, Ill., has just issued Catalog No. 19 entitled "O-S Coal Crushers," wherein they describe these crushers also locomotive cranes and buckets.

The J. M. Preston Co., Lansing, Mich., has just issued a bulletin entitled "The Preston-Lansing Vitrified Tile Silos and Grain Bins." The bulletin contains a description and construction details of the company's tile.

The Columbus McKinnon Chain Co., Columbus, Ohio, has issued a circular entitled, "Return to Prosperity." The circular contains an interesting chart showing the close relation that general business has to railroad purchases.

The Broderick and Bascom Rope Co., St. Louis, Mo., has recently issued a catalog entitled "Aerial Tramways," describing these tramways. Price List K dated March, 1921, is also ready for distribution. The list contains prices on pulleys and blocks as well as wire rope.

The Byers Machine Co., Ravenna, O., has announced the opening of two district sales and service offices; one in New York City, room No. 704, 30 Church St., with F. W. S. Elmes as manager and the other in St. Louis, Mo., room 700, Rialto Bldg., with Frank E. Miner as manager.

The Aurora Pump and Manufacturing Co., Aurora, Ill., has issued a new bulletin No. 100 entitled "Aurora Centrifugal Pumps." The bulletin describes the pumps manufactured by this company and also gives some tables containing valuable centrifugal pump data which would be interesting to users of these pumps.

The Domestic Engine & Pump Co., Shippensburg, Pa., has issued a catalog, No. 21-F, on pumps and engines. The catalog describes the power force and diaphragm power pump units; hoists and gasoline engines. The last few pages of the catalog contain pumping data of value to the practical user of these pumps.

The Federal Motor Truck Co., Detroit, Mich., possesses a new 5-6 ton model truck which has a number of new and distinctive features, according to a statement made by M. L. Pulcher, vice-president and general manager of the company. The new model has sufficient power to pull itself out of the most difficult places with its full capacity load, and a greater road speed under full load than has heretofore been possible with the average full-loaded heavy-duty truck, according to Mr. Pulcher.

The Pawling and Harnischfeger Co., Milwaukee, Wis., has just published a pamphlet S-2, which describes the new P & H Shovel Attachment for use with standard P & H types 205 and 206 Excavator-Cranes. Illustrations of the shovel attachment in use are shown and the economy of being able to use either the 30-foot crane boom or the shovel boom is pointed out. With the extra expense of only the Shovel Attachment, the number of applications of this material-handling and digging machine is increased—the shovel, it is said, having the ability to do the work of any steam shovel of equal weight.

The Engineering Advertisers' Association of Chicago, under the presidency of Keith J. Evans, advertising manager of Joseph T. Ryerson and Son, held a meeting recently in Chicago. They were addressed by Professor Horace Sechrist of Northwestern University on the subject of "Sales Analysis and Advertising Ratio Costs." J. F. Callbreath delivered a short address on gold and metal mining. The Engineering Advertisers' Association, although only two years old, is rapidly growing and is a large factor in the engineering field. Its active members are advertising and sales managers of nationally known concerns manufacturing engineering products and its associate membership is composed of one representative, each, from trade papers in the engineering and allied fields.

The Stearns Conveying Co., Cleveland, O., has been organized to engage in engineering, manufacturing and contracting work in the production of labor saving equipment, including elevating, conveying, screening and transmission machinery and accessories. Among its products the company will bring out a roller and ball-bearing belt conveyor with the ball and roller bearings enclosed in a grease reservoir in such a way as to prevent dirt getting in the bearings. Other products will include a pivoted bucket carrier and wagon loader. The company has been incorporated with a capital stock of \$300,000 and has opened temporary offices at 205 Vickers Building, Euclid Avenue and East Sixty-Fifth Street. It has acquired 3¼ acres on Cut Road near the New York Central Railroad, on which a building 50x100 ft. had been erected. Earl D. Stearns has resigned as vice-president and sales manager of the H. K. Ferguson Co. to become associated with the new company and will be its president. He was formerly connected with the Link-Belt Co., the Stephens-Adamson Mfg. Co., and the Fort Pitt Engineering Co. W. E. Phillips, formerly in charge of the different shops of the Stephens-Adamson Co., will be vice-president and superintendent and G. H. Whitham, secretary and treasurer.

CLASSIFIED ADVERTISING

Situations Wanted

SITUATION WANTED

Superintendent desires engagement where thorough knowledge of operation is essential for economical production. 20 years' experience quarries, well drills, and blasting, crushers, lime kilns, hydrate plants. Also capable of taking full charge of office.

Box 1485 Care Rock Products

Situations Wanted

SUPERINTENDENT

Practical quarry man, familiar with all details of quarry business. Competent executive. Long experience. Address

Box 1487 Care of Rock Products

POSITION WANTED

By practical Cement Mill Superintendent, 16 years' experience wet and dry plants. Can furnish A-No. 1 references and am employed at present but desire a change of location. Address

Box 1483 Care of Rock Products

Plant for Sale

FOR SALE

Complete one Stephen-Adamson washed gravel plant. Capacity 14 cars. Power oil engines.

Box 1486 Rock Products

Idle Machinery Absorbs Profits

This department is the medium for the men who keep the wheels going. Sell your idle machinery to the man who'll keep it going.

When writing advertisers please mention ROCK PRODUCTS



Rates for advertising in the Used Equipment Department: \$2.50 per column inch per insertion. Minimum charge, \$2.50. please send check with your order. These ads must be paid in advance of insertion.

Repaired Contractors' Equipment

Steam Shovels

Model 60 Marion Shovels, 2½-yard dippers, Nos. 1999, 2059, 2130

1—Model 1 Thew, on railroad trucks, ¾-yard dipper.

1—Bucyrus Model 70-C, Shop No. 1219.

2—Model 28 Marion Revolving, ⅝-yard dippers.

1—Model O Thew Revolving, ½-yard dippers.

1—Type "B" Erie Revolving, ¾-yard dippers.

We have a large stock of thoroughly repaired Construction Equipment of all kinds ready for immediate shipment.

Locomotives

8—18-ton, 10x16" Porter Dinkeys, 36" gauge.

2—12-ton, 9x14" Porter Dinkeys, 36" gauge.

1—17x24", 55-ton, 4-6-0, standard gauge.

3—25-ton Forney type.

Clam Shell Buckets

1—1¼-yard Williams Hercules Bucket.

Cars

30—Western Air Dump 12-yard, standard gauge.

40—Western 4-yard, 36" gauge, steel beam.

H. KLEINHANS COMPANY

Union Arcade

Pittsburgh, Pa.

NO. 8-D, GATES GYRATORY CRUSHER

STANDARD DRIVE

Fitted with manganese head and concaves. Included with this crusher, we have the following extra spare parts:

- 1 New, Manganese head.
- 1 New, set of manganese concaves.
- 1 New, main shaft.
- 1 New, Spider, and 2 New, eccentrics.

We also have many other sizes and types. We specialize in good quarry equipment of all classes. Write us fully.

Reading Engineering Co., Inc.
1227 Tribune Bldg., New York, N. Y.

FOR SALE

1—No. 2, 11x20 Aurora Jaw Crusher, manufactured by Western Wheeled Scraper Company. New Manganese Dies. Rated capacity, 25 tons per hour.

1—No. 18 Universal Crusher Company Pulverizer. Practically new, used less than one week. Rated capacity, 12 tons per hour.

1—Magnetic Separator Pulley. Practically new. Manufactured by Cutler-Hammer Manufacturing Company. 12" diameter for 20" belt, 230 volts, for use with above Pulverizer.

Above machinery in best condition, ready for use, and offered for sale only because being replaced by machines with larger capacity.

Can be inspected at our plant at New Castle, Pa.

Universal Sand Company
New Castle, Pa.

LOCOMOTIVES

One—68-ton, standard gauge, Baldwin Mogul; 180-lb. pressure.

One—56-ton, standard gauge, American 10-wheeler; 175-lb. pressure.

Two—50-ton, standard gauge, Brooks 6-wheel switchers; 160-lb. pressure.

One—65-ton, standard gauge, Shay Geared Locomotive.

One—24-ton, standard gauge, Shay Geared Locomotive.

One—14-ton, 36" gauge, American Saddle Tank.

Two—23-ton, brand new, 36" gauge, Porter 6-wheel switchers; separate tenders.

One—Model 14-B Bucyrus Shovel.

The above are only a few items of our stock. Will gladly send you our complete stock lists.

Birmingham Rail & Locomotive Co.
Birmingham, Ala.

USED EQUIPMENT

Rates for advertising in the Used Equipment Department: \$2.50 per column inch per insertion. Minimum charge, \$2.50. Please send check with your order. These ads must be paid in advance of insertion.

Machinery For Sale

DRYERS—Direct-heat rotary dryers, 3x25', 3½x25', 4x30', 5½x50' 6x50' and 7x60'; double shell dryers, 4x20', 5x30' and 6x35'; steam-heated air rotary dryers, 4x30' and 6x30'.

KILNS—Rotary kilns, 3½x25', 5x60' and 6x70', 6x100', 7x80' and 8x110'.

MILLS—6x8', 6x5', 2½x3' 3x3½' pebble and ball mills; 8x4', 6x4' and 4x4' continuous ball mills; 3' March mill; 42", 33" and 24" Fuller-Lehigh mills; 4½x20', 5x11', 5x20', 5½x22' and 6x20' tube mills; 7½x13", 9x15", 16x10" and 30x60" jaw crushers; one "Infant" No. 00, No. 0, No. 2, No. 3, and No. 9 Williams' swing hammer mills; one Kent type "C" mill; 36" and 40" cage mills; 3' and 4½' Hardinge mills; 18x12", 20x12" and 30x10" roll crushers; No. 0, No. 1 and No. 3 Sturtevant rotary crushers; one No. 2 Sturtevant ring roll crusher; 3 roll and No. 000, No. 00 and No. 0 Raymond mills; one No. 5 Telsmith breaker; one 36" Sturtevant emery mill; one 3 roll Griffin mill; 60" chaser mill.

SPECIALS—Five automatic package weighing machines; jigs; one keystone excavator; 6x8', 6x5' and 4x3' Newaygo vibrating screens, Richardson automatic scales.

Air compressors and tanks.

W. P. Heineken, Engineer

95 Liberty Street, New York. Tel. Cortland 1841

FOR SALE

One—Westinghouse 780 KVA (625 KW) Turbine Outfit.

One—Westinghouse-Leblanc Condenser.

One—16 KW Exciter Outfit.

All in first class condition. For full particulars address

Phoenix Portland Cement Co.
Nazareth, Pa.

FOR SALE

One Erie Steam Shovel, Type B, No. 1321, in perfect condition; only been used 4 months.

The Smallwood-Low Stone Co.
Lisbon, Ohio

FOR SALE

One new Milwaukee Clam Shell bucket, one yard.

Baker Sand Company
Benton Harbor, Michigan.

FOR SALE

One—No. 8 Type K Gates Gyratory Crusher. For particulars address

BUCKEYE STONE COMPANY
428 Slaughter Bldg. Dallas, Texas

FOR SALE

Raymond Bros. Pulverizer No. 0, complete with dust collector, crusher and fan direct driven; used only two months; all parts in first-class condition.

For particulars address

Beaver Falls Art Tile Co.
Beaver Falls, Pa.

Immediate Delivery

6, 7½, 9, 10 and 18 K Crushers

18 K ANGLE DR. \$11,000.00.
No. 4 GYRATORY CRUSHING PLANT, N. Y.
2—18-in. and 24-in. Disc Crushers.
2—150-Hp. 125-lb. Marine type boilers and others.
No. 10 McCULLY—BARGAIN, \$6,750.00.
4 No. 6 Gates (Mang. Pit.) nickel steel shafts.
50- and 75-Hp. single drum hoists for motor drive.
No. 2, 3 and 4 Gates, reg. drive crushers.
Air Compressors (steam-belt) 50 to 4000 ft.
5, 6 and 12 ton, 24-in. gauge gasoline locomotives.
1—8x8 and 10x10 Air Comp. (belt).
2—180-ft. Quick Shift, 30-ft. bucket towers.
6-in., 8-in. and 10-in. SAND PUMPS.
25—40-Hp. Thomas D. D. Elec. Hoist, 440 V. A. C.
5-, 10- and 15-ton HOLD TRACTORS, PRAC. NEW.
1, 2 and 3 DRUM STEAM AND ELEC. HOISTS.
Send us your inquiries—Sand Pumps, Motors, Contractors' Equipment, etc.

ROSS POWER EQUIP. COMPANY
Indianapolis, Ind.

No. 6 Gyratory Crushers

Two Chalmers & Williams Standard rear drive. Used very little. Attractive price. New Jersey delivery.

Relaying rails, 20-lb. to 100-lb. section in stock at our Chester, Pa., yard. Let us quote you.

E. H. Wilson & Company
Commercial Trust Building
Philadelphia

WANTED

2 cu. yd. dipper for 60-C. Bucyrus Steam Shovel.

Beverly Stone & Sand Co.
Liberty, S. C.

Locomotives for Rent and Sale

2—32-ton Vulcan four-driver saddle tank, used sixty days.
1—40-ton Vulcan four-driver saddle tank.
1—40-ton 17x24" four-wheel switcher.
2—50-ton 18x24" six-wheel switchers.
2—NEW 25-ton six-wheel Porters, separate tenders, 36" gauge.
2—18, 14, and 10-ton Vulcans, 36" gauge.

MISCELLANEOUS

13—6-yd. re-built dump cars, std. gauge.
20—12-yd. Westerns, like new, std. gauge.
50—60,000-lb. capacity flat and box cars.
1—Western standard gauge spreader.
1—Marion 36 steam shovel on traction wheels.
1—Marion 76 steam shovel, No. 3593, std. gauge.
2-in., 4-in., and 6-in. simple, duplex, and centrifugal pumps, new 3-drum hoists, road rollers, and tripod drills.

Locomotive Cranes, Railway Equipment, Etc.

INDUSTRIAL EQUIPMENT CO.
McCormick Building, Chicago, Ill.

"Everything for the Quarry"

¾-yd. Thew "O" Traction Shovel.
3-ton Plymouth 4' 8 ½" ga. Gasoline Locomotive.
7x12 cyl. 36-in. gauge Davenport Saddle Tank.
9x14 cyl. 36-in. gauge Vulcan Saddle Tank.
10x16 cyl. 36-in. gauge Porter Saddle Tank.
10—24-in. gauge 1½-yd. Western Dump Cars.
15—36-in. gauge 4-yd. Western Dump Cars.
3—16-yd. Western Air Dump Cars.
33-in. R. H. Lehigh Fuller Mills.
7x10 and 8x10 DC, DD Hoisting Engines.
Rails, Boilers, Derricks, Steam Shovels, Tanks.

ZELNICKER IN ST. LOUIS

Before You Buy Get Big Bulletin 290.

New—RAILS—Relaying

All sections on hand for quick shipment. Reasonable prices quoted. Our stock is very complete.

M. K. FRANK
Frick Building Pittsburgh, Pa.

FOR SALE

2 Heine Watertube Boilers, 409 Hp. each. For further particulars address

Phoenix Portland Cement Co.
Nazareth, Pennsylvania

FOR SALE

1—36" American Pulverizer.
1—1 yard (new) Riesler clam shell bucket.

Acme Brick Co., Milwaukee, Wis.

Have you a plant for sale? Do you wish to purchase a plant? Are you in need of a superintendent or manager? Are you looking for a position as plant superintendent or manager? Advertise your wants in these columns for quick results.

When writing advertisers please mention ROCK PRODUCTS



PERFORATED SCREENS AND STEEL PLATE WORK

W. Toepfer & Sons Co.
Milwaukee Wisconsin

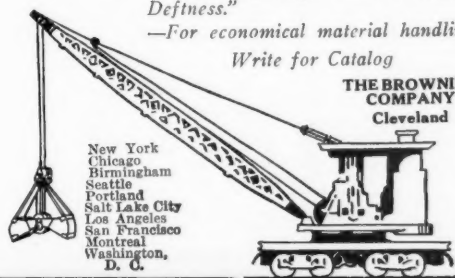
Browning Locomotive Cranes

"A Giant's Strength with a Wizard's Deftness."

—For economical material handling.

Write for Catalog

THE BROWNING
COMPANY
Cleveland



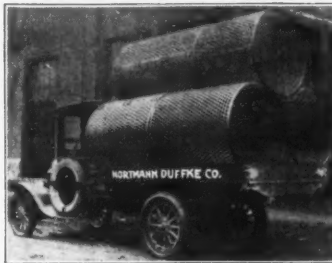
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We have the technical knowledge and the equipment that enables us to meet your most exacting needs quickly.

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TERRY

FAMOUS
DERRICK IRONS, FITTINGS
AND ERECTORS' TOOLS



FULL CIRCLE CRANES.

"EQUIPMENT THAT LASTS."

TIMBER & STEEL DERRICKS.

LET US SOLVE YOUR MATERIAL HANDLING PROBLEMS.

All Types of

Steel and Timber DERRICKS

TERRY

Electric Motors



Large Stock of New
and Used

**Motors and
Generators**

Repairs for Any Make
or Type

Sorgel Electric Co., Milwaukee, Wis.

ANCHOR BRAND COLORS

For Mortar, Cement and Brick—
Brown, Black, Red and Buff
—Strongest and Most Durable

Manufactured by

C. K. Williams & Co.

Correspondence Solicited

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SCREENS of All Kinds



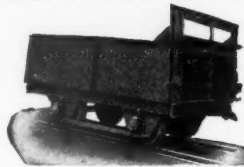
Chicago Perforating Co.

2445 West 24th Place

Tel. Canal 1459

CHICAGO, ILL.

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Ruggedly constructed Easton Rocker Dump Cars, cars of all types, standard or special, and complete narrow gauge railway equipment from track up—built for enduring service and backed up by thirty years of Easton experience—are available for every car haulage requirement in the rock products industry.

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Works: Easton, Pa.

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Robins Conveying Machinery

is handling limestone, clinker, cement in bulk and in bags, gypsum, sand, gravel, crushed stone and many similar materials. Write for a copy of the Robins Handbook of Conveyor Practice and learn more about the Robins System.

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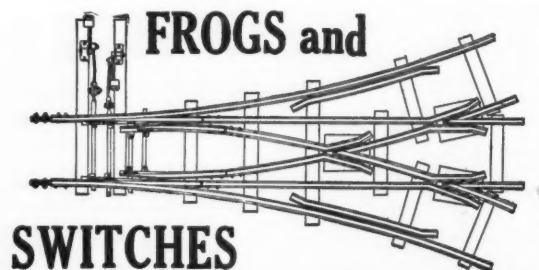
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Salt Lake City, Newhouse Building

PORTER LOCOMOTIVES

For Every Purpose

H. K. PORTER COMPANY
PITTSBURGH, PA.

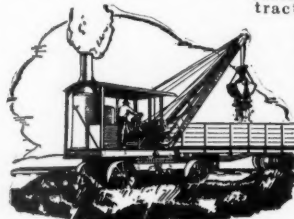


SWITCHES

The Central Frog & Switch Co., Cincinnati, O.
Frogs, Switches, Crossings, Switch Stands, Rails, Angle Bars, Fishplates, Throws, Rail Braces, Tie Plates, Portable Track, Etc., Etc.

Mounted to Suit the Job

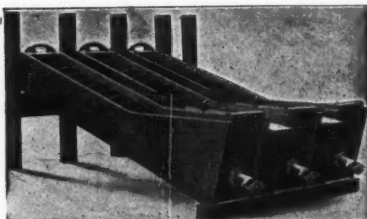
Byers Self-Propelling Cranes ("Auto-Crane" and Full-Revolving) come mounted on broad-tire road wheels; crawling traction treads



("caterpillars") under one or both ends; or railroad wheels of any gauge. Your choice of power; boom equipped with clam, orangepeel, skip, hook, etc. Write for particulars.

THE BYERS MACHINE CO.
310 Sycamore St., RAVENNA, OHIO

Sales Representatives
in 25 Leading Cities



Sand Washers



9-Foot Dry Pan

Lewistown Foundry & Machine Co.
LEWISTOWN, PA.

Builders of heavy duty crushers and glass sand machinery. Glass sand plants equipped complete.

Write for prices and catalog



for elevators, dredges, lumbering, mining, oil-well drilling, suspension bridges, stump pulling, cranes, derricks, ships' rigging and every other form of wire rope use

Illustrated
Catalogue
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American Steel & Wire Co.
Chicago New York

ARNOLD & WEIGEL

CONTRACTORS AND ENGINEERS
WOODVILLE, OHIO

Specializing in

The Design of Modern Lime
Calcining and Hydrating Plants



Owen Buckets

combine dollar-sav-
ing features of bucket
construction which
are illustrated in our
latest catalogue.

Write for it today.

THE OWEN BUCKET CO.
538 Rockefeller Bldg., Cleveland, Ohio

"Hercules Solid Weld" Steam Shovel Chains



Best In the World. Will Actually Wear Out

The Columbus McKinnon Chain Company
Columbus, Ohio

Maddox Foundry & Machine Company ARCHER, FLORIDA

Manufacturers of the

Abbott Improved Crusher Feeder

Indispensable where clay or sticky material is
mined.

We manufacture washing, crushing and drying
machinery for phosphate and lime rock, suction
and dipper dredges.

We contract for complete plants.

The Advance Engineering Company Cleveland, Ohio

The "ADEN" Crane and Bucket

Special Interest to Sewer Contractors and Special Excavation Problems



E. 140 St. Sewer, Cleveland, O., — 34-Yd. Heavy Bucket being used

SAUERMAN DRAGLINE CABLEWAY EXCAVATORS dig, convey, elevate and dump in one operation

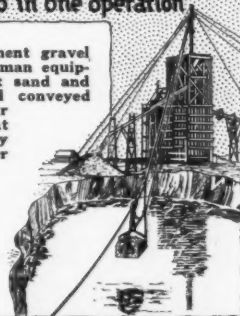
Cost data furnished by prominent gravel
producers who are using Sauerman equip-
ment backs up our claim that sand and
gravel can be excavated and conveyed
from pit to plant by one of our
drag-line cableway excavators at
a lower cost per ton than by
using any other equipment or
combination of equipment.

Write for Catalog No. 7

Sauerman Bros.

1140 Monadnock Bldg.
Chicago

Also Mfrs. of Power Scrapers



The House of Dependable Service HYMAN-MICHAELS COMPANY

Peoples Gas Building

CHICAGO

NEW AND RELAYING RAILS

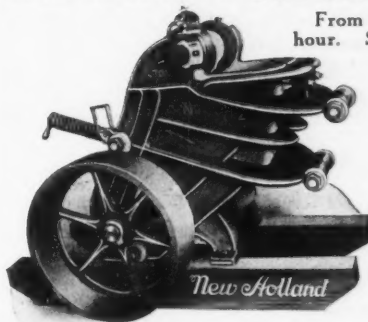
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New Holland Rock Crushers



From 2 to 10 ton capacity per
hour. Sand Crushing and Pul-
verizing Machinery.
Revolving Screens—
Jolt Sifters, Elevators.

Highest in Quality,
Large Capacity. Easy
Running—Lowest
Prices. Satisfaction
Guaranteed.

Write for prices.

NEW HOLLAND
MACHINE CO.
New Holland, Pa.

J. C. BUCKBEE COMPANY ENGINEERS

BUILDERS OF CEMENT PLANTS

FIRST NATIONAL BANK BUILDING
CHICAGO, U. S. A.

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Inspection—Tests—Consultation

Inspection New and Second Hand Machinery, Pumps, Crushers,
Steam Shovels, Cars, Locomotives, Rails and Quarry and
Contractors' Equipment

INSPECTION AND TESTS OF SAND, GRAVEL, CEMENT, STRUCTURAL
STEEL, CASTINGS AND CONSTRUCTION MATERIALS

Cement, Chemical and Physical Testing Laboratories

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St. Louis

Kansas City

CHICAGO

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San Francisco

We Design and Equip Complete Plants

for the manufacture of gypsum products, such as wall
plaster, moulding plaster, wall board products, gypsum
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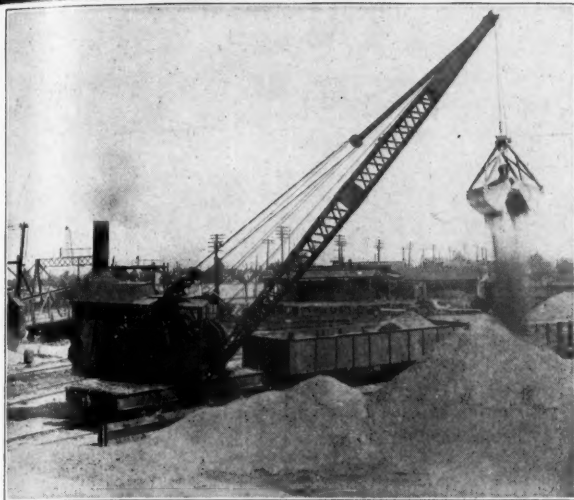
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This crane has proven to the satisfaction of a large number of owners that the heavier crane is the cheapest one to buy for some classes of service. The Type "J" is only one of a large number of cranes manufactured by this Company.

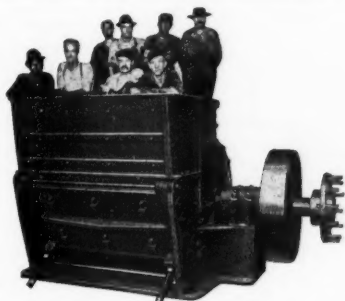
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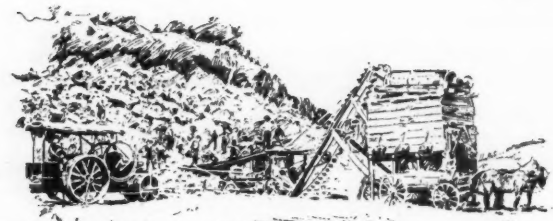
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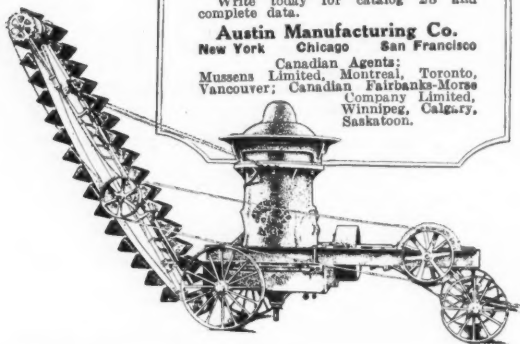
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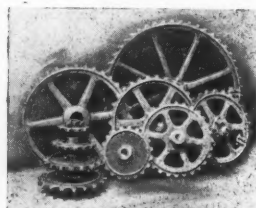
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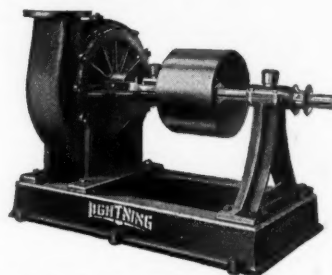
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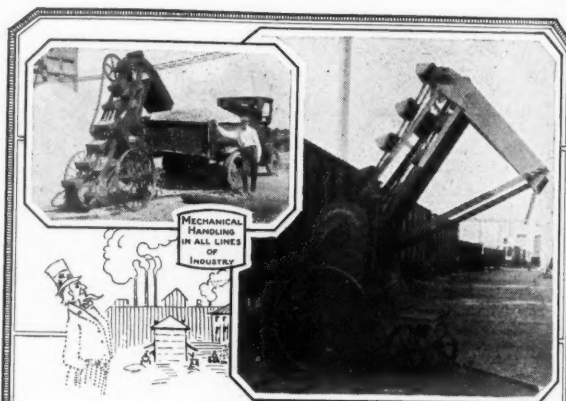
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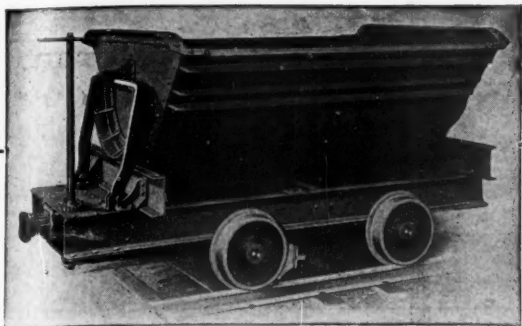
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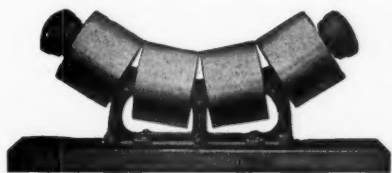


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will solve your handling problem. Simple in design, economical of power, they give the utmost satisfaction. Our forty years' experience has made us thoroughly familiar with the many details of construction necessary to success.

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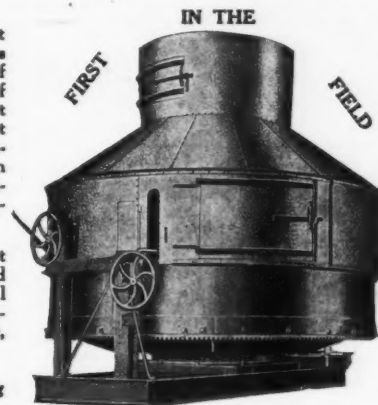
The Clyde was first in the field, and through dependable and economical performance is still first choice of lime operators.

The Clyde Hydrator produces big capacities of lime at only three-fifths the cost of any other hydrator on the market.

The Clyde not only produces over 90% of the hydrate of America, but makes the best quality of finishing lime from either high calcium or magnesium.

Simple, easiest to operate and most economical in cost of installing, maintaining, and operating.

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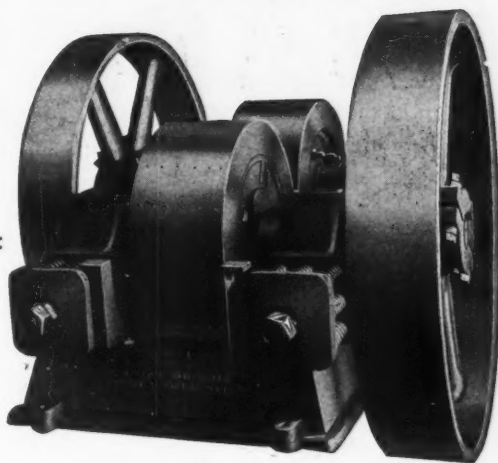


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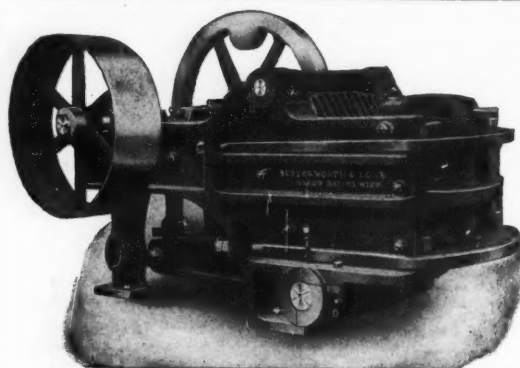
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Nippers—17x19", 18x26", 20x30", 24x36" and 26x42"

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For All Rocks and Ores
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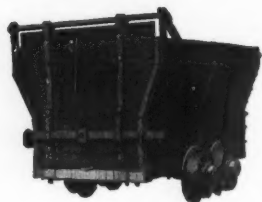
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Special Crusher-Grinders for Lime

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20" to 47"
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Many
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"Perfect" Concrete Brick Power Machine

Also Hand and
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C. S. WERT—Inventor and Patentee

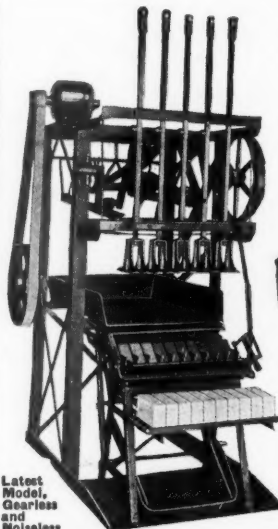
Turns out, with four men, 16,000 to 20,000
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In severe tests, Perfect Concrete Brick
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The power tamper may be operated by a
one horse power motor, a 2½ horse power
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"There is no better brick machine
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a Perfect brick plant.

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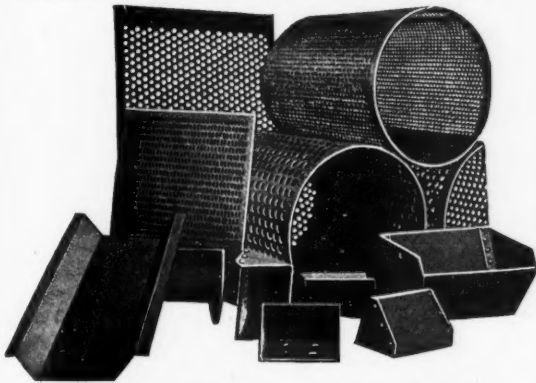
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Gearless
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GEAR AND FRICTION DRIVEN
GASOLINE LOCOMOTIVES—2 1/2
TO 25 TONS ON DRIVE WHEEL

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STORAGE BATTERY LOCOMO-
TIVES—1 TO 8 TONS ON
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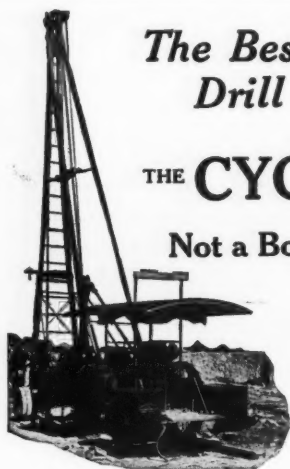
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If the Cyclone doesn't out-drill and out-wear all other drills, we will remove it from the work without cost to you.

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The biggest value for your money. Universal crushers and pulverizers reduce stone to desired size or fineness in a jiffy! Fifteen years of designing and building experience have made possible the exceptional ability of Universals.

Universal Crusher Co.

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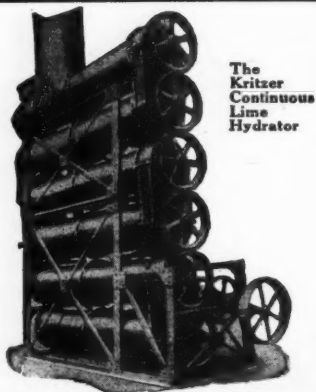
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Lime
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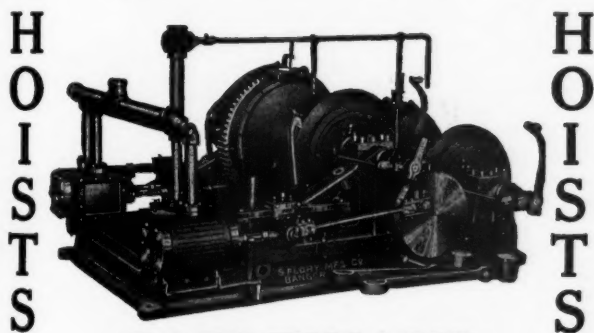
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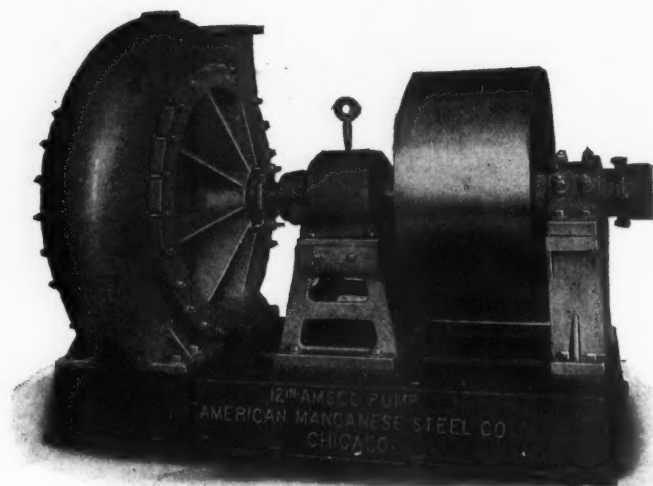
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AMSCO SAND AND GRAVEL PUMPS



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Save delays
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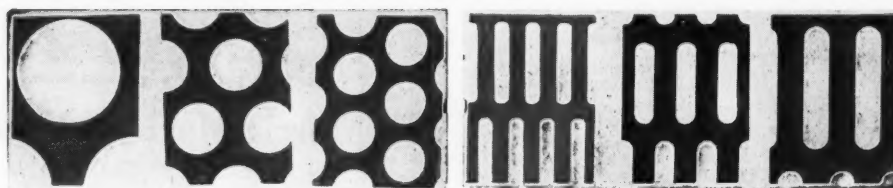
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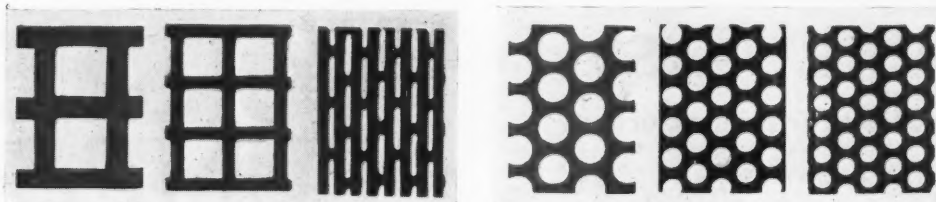
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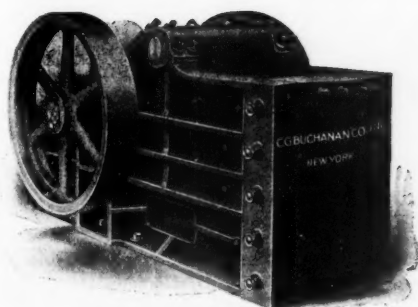


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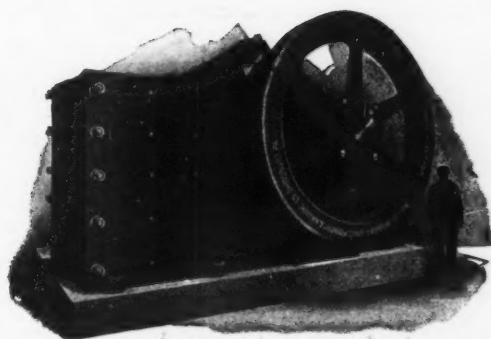
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ALL STEEL PATENTED

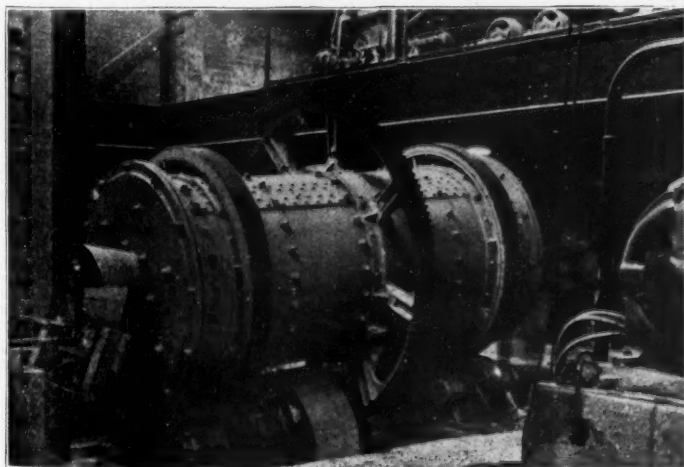
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CRUSHING MACHINERY, CRUSHING ROLLS, AND MAGNETIC SEPARATORS

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When grinding hard and tough material to the finest mesh the Marathon has practically four times the capacity per H. P.—and by a simple adjustment it can turn out the finest mesh the first time through without separation. No other machine on the market can equal this performance.

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Manufactured by

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With such equipment operators of mines and quarries are moving thousands of tons daily

Break Jail! Why Be a Prisoner to High Production Costs

when the

AUTOMATIC AERIAL TRAMWAY

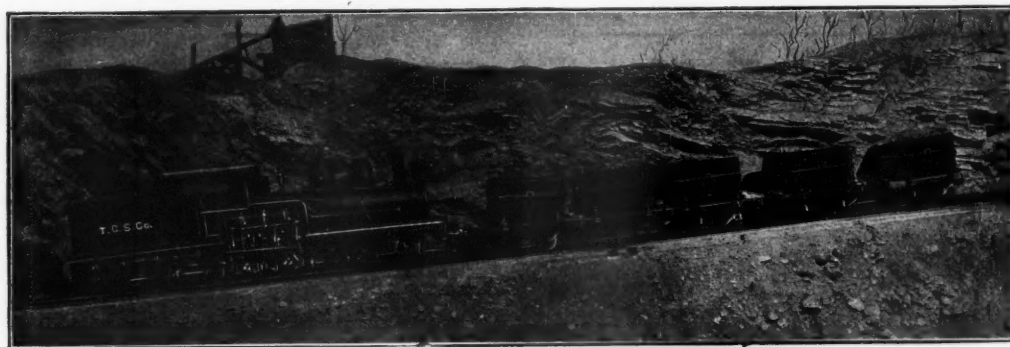
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**More Tons Moved
Less Labor Required**

**Man Power Is Waste Where Machinery
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Let Us Solve Your Problem
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Interstate Equipment Corporation
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FULFILLING EXPECTATIONS

One quarry company has over 70 Shays at work.

They selected "SHAYS" a good many years ago.

The service these engines gave them has more than fulfilled their expectations.

Three cylinder power plant, flexible geared

drive, and small driving wheels accounts for the "Shay" performance.

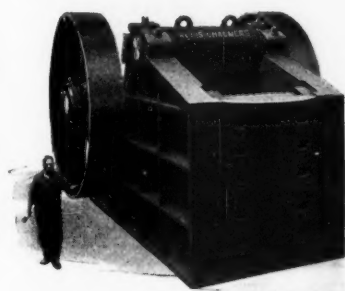
Rugged, sturdy design and construction plus high grade workmanship and materials accounts for their low maintenance cost.

"SHAYS" give increased production at lower costs than rod engines.

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Meet the most exacting demands as to Duty, Efficiency and Reliable Service



All Steel Jaw Crusher
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All Steel

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Type "B"

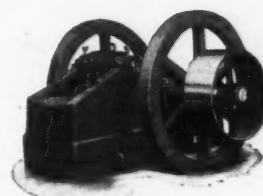
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Type "B" Jaw Crusher
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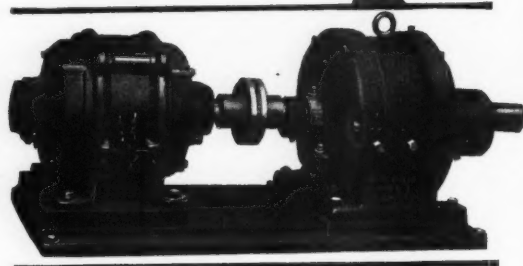
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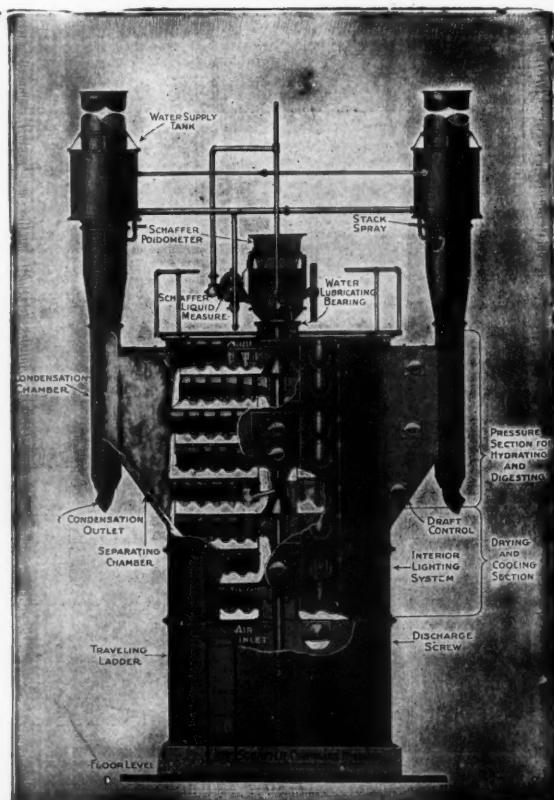
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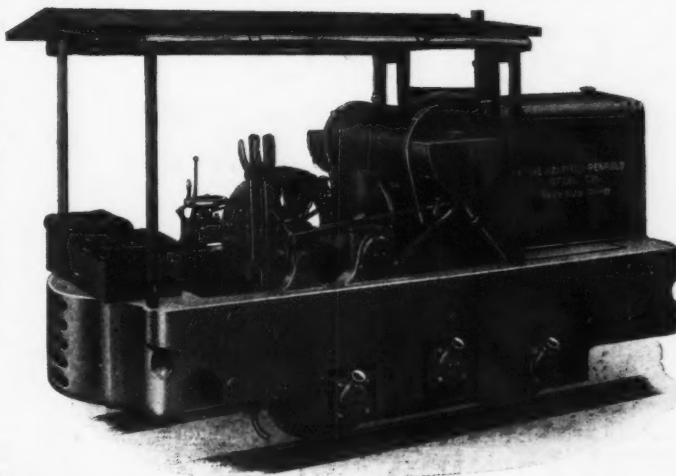
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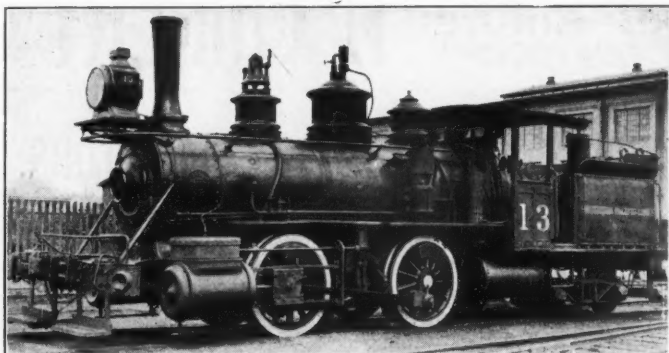
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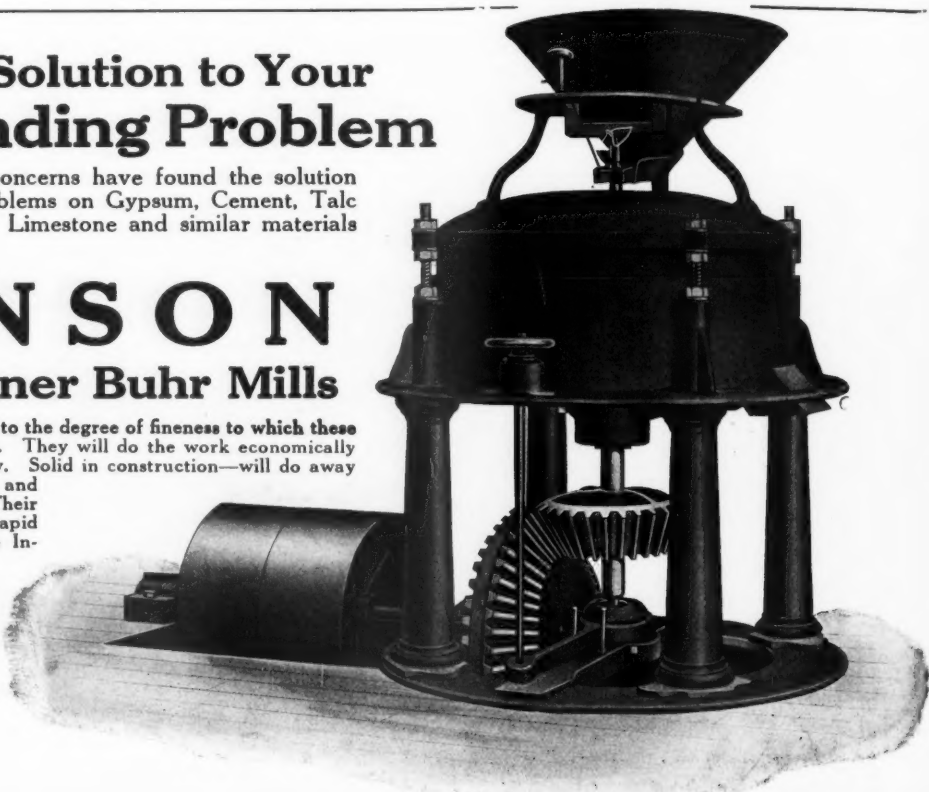
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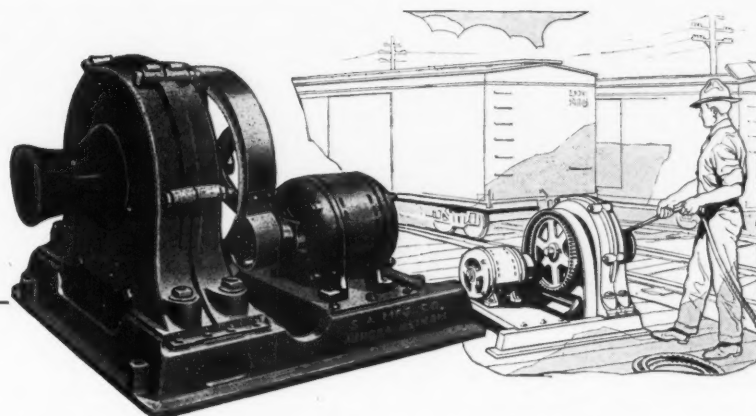
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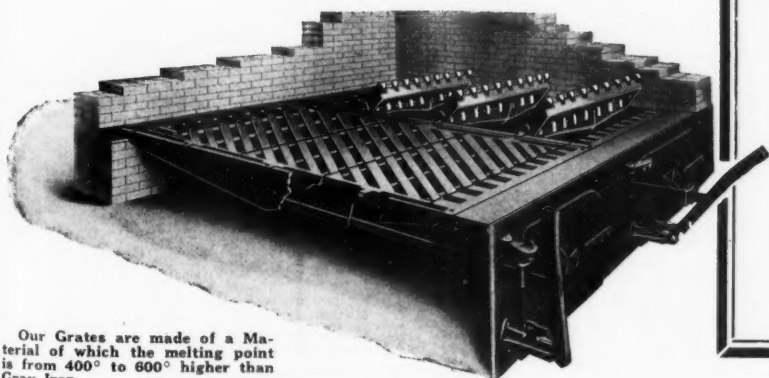
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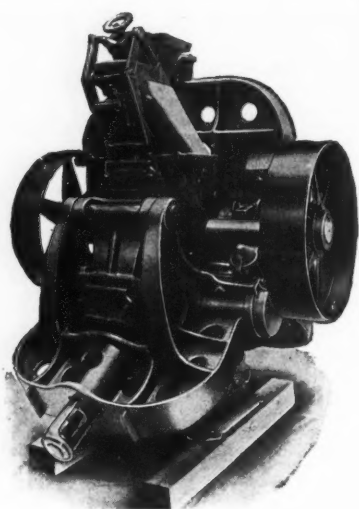
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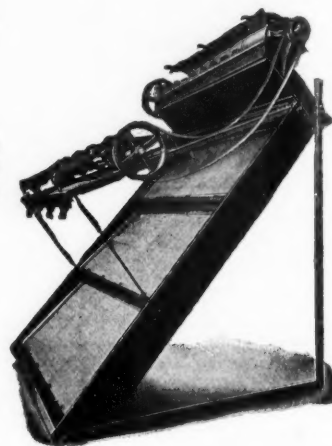
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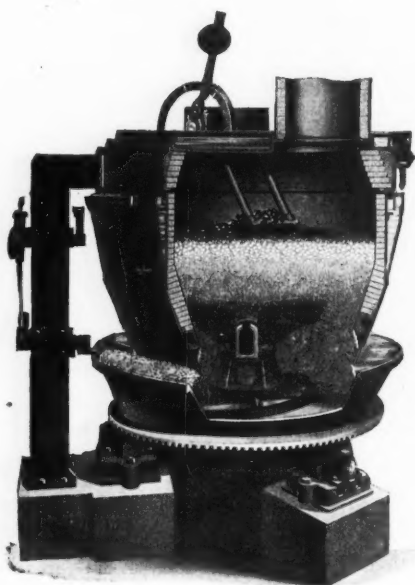
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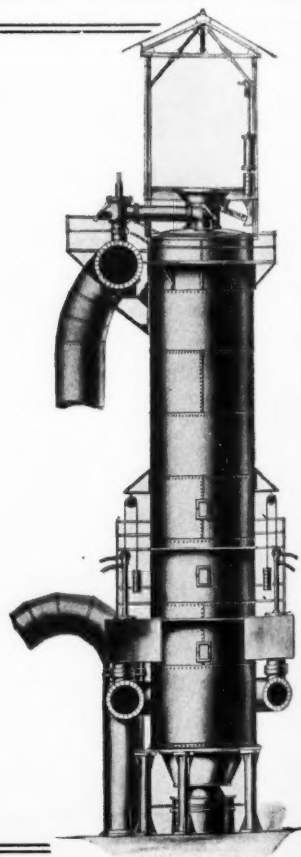
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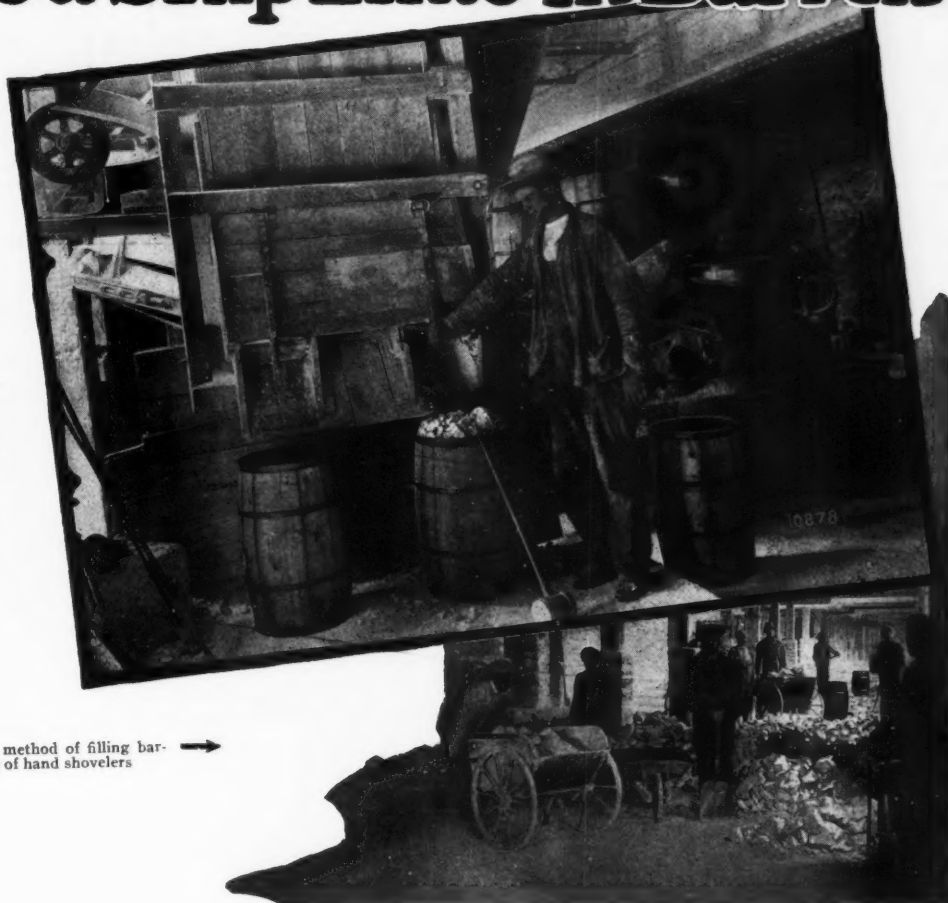
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